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John W. Davis
Simon Flexner
Raymond B. Fosdick
Frederick T. Gates[1]
Harry Pratt Judson[2]
Vernon Kellogg
John D. Rockefeller[3]
John D. Rockefeller, Jr.
Wickliffe Rose
Julius Rosenwald
Martin A. Ryerson
Frederick Strauss
George E. Vincent
William Allen White
Ray Lyman Wilbur

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Wallace Buttrick
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Treasurer

Louis Guerineau Myers

Comptroller

Robert H. Kirk

General Director of the International Health Board

Frederick F. Russell

Director of the China Medical Board

Roger S. Greene

Director of the Division of Medical Education

Richard M. Pearce

[1] Resigned July 2, 1923.
[2] Resigned December 5, 1923.
[3] Resigned December 4, 1923.

THE ROCKEFELLER FOUNDATION
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1924

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THE ROCKEFELLER FOUNDATION

President's Review

To the Members of the Rockefeller Foundation:

Gentlemen:

I have the honor to transmit herewith a general review of the work of the Rockefeller Foundation for the period January 1, 1923, to December 31, 1923, together with the detailed reports of the Secretary and the Treasurer of the Foundation, the General Director of the International Health Board, the Director of the China Medical Board, and the Director of the Division of Medical Education.

Respectfully yours,

GEORGE E. VINCENT,

President.

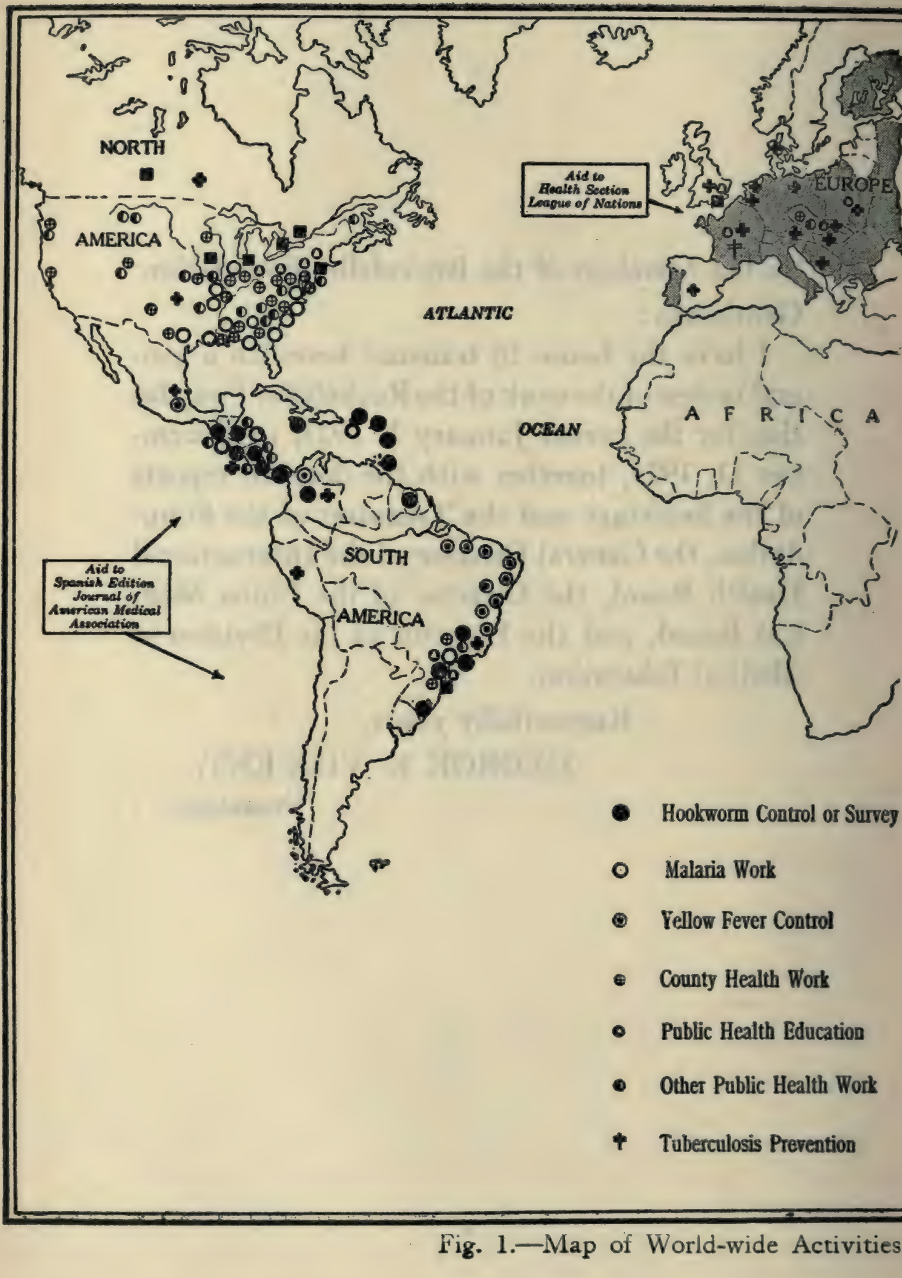
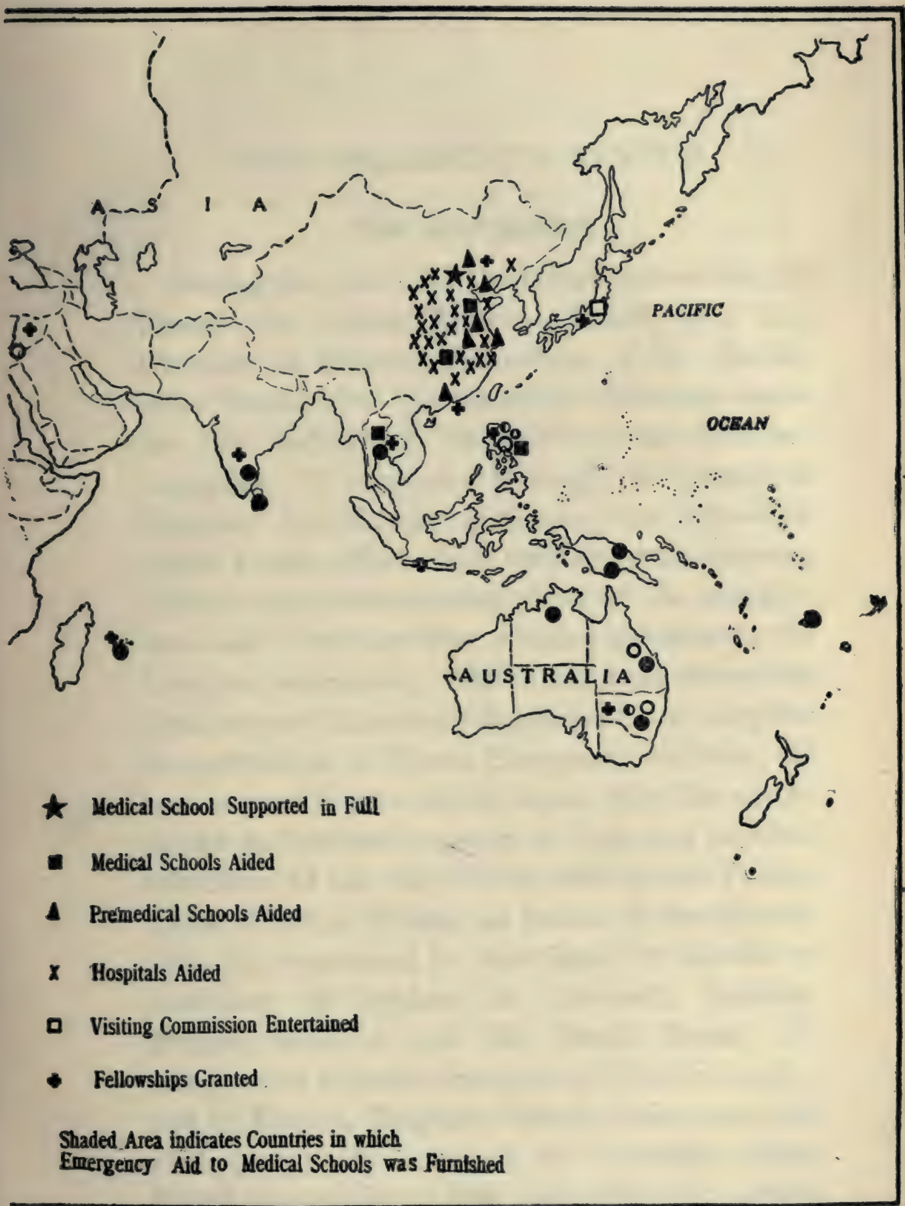


Fig. 1.—Map of World-wide Activities



of the Rockefeller Foundation in 1923

THE PRESIDENT'S REVIEW

The Year in Brief

During the year 1923 the International Health Board, the China Medical Board, and the Division of Medical Education of the Rockefeller Foundation (1) supplied fellowship funds for 636 individuals in twenty-nine different countries; (2) supported through the League of Nations interchange institutes for fifty-four public health officers from twenty-seven nations; (3) arranged international visits of one commission and of twenty-four visiting professors; (4) furnished emergency relief in the form of medical literature or laboratory equipment and supplies to institutions in fifteen European countries; (5) sent scientific material to Japan after the earthquake and invited a group of Japanese medical scientists to use the laboratories of the Peking Union Medical College as guests of the institution; (6) continued to contribute to schools or institutes of hygiene at Harvard, London, Prague, Warsaw, and São Paulo, Brazil; (7) co-operated in nurse training at Yale University and in France, Belgium, Brazil, China, and the Philippines; (8) accepted an invitation from Brazil to participate in a comprehensive attack

upon yellow fever; (9) had a share in demonstrations of malaria control in twelve American states and conducted malaria surveys or studies in the United States, Brazil, Australia, Nicaragua, Porto Rico, Salvador, the Philippine Islands, and Palestine; (10) either continued or began antihookworm work in conjunction with twenty governments in various parts of the world; (11) contributed to 183 county health organizations in the United States, New Brunswick (Canada), and Brazil; (12) continued a study of the medical schools of the world by visits to Belgium, Austria, Czechoslovakia, Germany, Hungary, Poland, Turkey, Hongkong, the Straits Settlements, Siam, Canada, England, Scotland, Wales, the Netherlands, Mexico, and Colombia; (13) offered to contribute 280,750 pounds sterling to the development of medical education in certain universities in the British Isles; (14) gave $500,-000 to the University of Alberta, and pledged $250,000 to the University of Pennsylvania toward buildings for anatomy and physiological chemistry; (15) continued to support a modern medical school and teaching hospital in Peking; (16) aided two other medical schools and twenty-five hospitals in China; (17) assisted premedical education in several institutions in China and agreed to do this also in Bangkok, Siam; (18) lent representatives to governments and insti-

tutions for various types of counsel and service; (19) continued to support a disease reporting service of the Health Section of the League of Nations; (20) contributed to mental hygiene projects, demonstrations in dispensary administration, organization of dispensary work in France, and to other undertakings in the fields of public health and medical education.

In 1923 the International Health Board was administered by Dr. Frederick F. Russell who succeeded, as General Director, Mr. Wickliffe Rose when the latter resigned on March 1 to assume the Presidency of the General Education Board and of the International Education Board. The trustees of the Foundation created in December, 1923, a new administrative unit known as the Division of Studies and appointed the Secretary of the Foundation, Mr. Edwin R. Embree, Director of this Division.

"The Peaceful Strife of Science"

The phrase is Pasteur's. At an international scientific congress in Italy he spoke in paradox, declaring that science is at the same time of no nationality and also the highest expression of nationality. "Science", he said, "has no nationality because knowledge is the patrimony of humanity, the torch which gives light to the world. Science should be the highest personifi-

cation of nationality because, of all the nations, that one will always be foremost which shall be first to progress by the labors of thought and of intelligence. Let us, therefore, strive in the pacific field of Science for the pre-eminence of our several countries."

The great French scientist loyally exemplified this ideal. He worked unremittingly for the welfare and prestige of France but he never forgot that he was also adding to the knowledge which is the "patrimony of humanity." This ever-growing common fund is reviewed, rectified, reorganized, and augmented by thousands of investigators in university and industrial laboratories, botanical and zoological gardens, agricultural experiment stations, hospitals, and research institutes of many kinds in almost all the countries of the world.

To keep the workers conscious of their common task, to recruit young men and women and to train them for productive work, to make sure that each investigator has an opportunity to know what others are doing in his special field, to put new knowledge at the service of the whole world as soon as may be, these are aims of modern science thought of as a vast team-work of the nations.

It was the privilege of the Rockefeller Foundation in the year 1923 to have a part in the re-

cruiting and training of young scientists by promoting international migration. Either directly or through other agencies it provided fellowships for 636 men and women who were preparing for teaching or administration in public health, medicine, biology, physics, chemistry, medical and premedical education, and nursing. Of these fellowships the International Health Board granted 130 (including staff members on study leave), the China Medical Board 135, the Division of Medical Education 51, the National Research Council 113, a German committee 194, the British Medical Research Council 4, other agencies 9.

The fellowship stipends varied from sums sufficient for all costs of travel, living expenses, and tuition fees to small supplementary grants as, for example, in the case of German resident fellowships (see page 17). Twenty-nine countries were represented by the fellows of 1923. Of the total number, 213 pursued studies in countries other than their own. The sum spent on account of fellowships was $302,838.

The Story of One Fellowship

Dr. X. had received a medical degree from the leading university of his country and had had successful experience in both administrative and teaching positions in public health work. After

the war his country asked the International Health Board to send a representative for conference and counsel. A plan of co-operation was worked out which, among other things, called for several fellowships for study in the United States. A special committee of selection nominated Dr. X. for one of these fellowships. Approved by the Board's representative, his appointment was confirmed in New York.

All arrangements for Dr. X's journey to New York were made for him. The United States immigration officials, who had been notified in advance, made his admission a prompt and courteous formality. A representative of the Board met him at the pier. In conference with officers of the Board and the Adviser for Fellows a plan of studies was outlined.

This program included practical experience with three state boards of health, the health department of a large city, several county health organizations, and the United States Public Health Service, as well as a systematic course of study in the Johns Hopkins School of Hygiene and Public Health. Dr. X. also had an opportunity to see other types of health work in different parts of the United States and in two other countries. During his period of study Dr. X. was visited at intervals by the Adviser for Fellows who made sure that all was going well.

On his return Dr. X. received an appointment in the public health service. His work soon attracted attention and led to promotion to a more responsible position in which he is showing a remarkable capacity for promoting the cause of public health. The case of Dr. X. is not exceptional. It illustrates clearly the theory of the Foundation's fellowship plan, namely, careful selection of promising individuals to be specifically trained for service in definitely prearranged positions in their own countries.

The League of Nations Interchange

It is not enough that many young workers should get a part of their training in foreign lands, and thus feel the stimulus of contrasts and of generous rivalry. Older persons, already in important official positions, need experience abroad, the chance to make comparisons, to get new ideas, to meet colleagues, to feel a sense of comradeship across national frontiers. It was a happy idea of the Health Section of the League of Nations to establish what are termed interchanges of health officials, or international institutes, which are attended by representatives of several countries.

Two such institutes were held during 1923. Early in the year twenty-nine health officers from Austria, Belgium, Czechoslovakia, Den-

mark, Finland, France, Hungary, Italy, Japan, Norway, Poland, Rumania, Russia, Sweden, the United States, and Yugoslavia, assembled in London. After a preliminary study of the English system of central and local health administration, the party broke up into small groups which proceeded independently to an intensive study of health conditions and organization in some large provincial city, a county, typical agricultural and industrial districts, and a large port. After three weeks in the provincial areas and another week spent in studying the special health problems of London, the group went to Austria where a similar program was carried out.

The other session assembled in the United States in September. Twenty-five delegates represented eighteen countries, including four which are not members of the League—Germany, Mexico, Russia, and the United States. After general sessions in New York and Washington the party was divided into sections which studied health activities in typical city and rural areas in Virginia, Alabama, North Carolina, Pennsylvania, New York, and Massachusetts. A final conference of the European delegates was held in Geneva for a review and discussion of their experience in the United States.

The value—scientific, practical, and international—of such meetings as these is unquestion-

able. The by-product in friendliness and good will is by no means negligible. The International Health Board is providing the funds for a period of years to meet the expenses of these interchanges.

Ambassadors of Science

Still other migrations of scientific men took place under the Foundation's auspices during 1923. Twenty-four specialists in medicine, public health, or physical science, representing seven different nations, visited other countries than their own as guests of the Division of Medical Education, the China Medical Board, and the International Health Board. These visits varied in length from a few weeks to several months.

A commission of six distinguished Japanese scientists—two professors of medicine, two of pathology, one parasitologist, and one surgeon—made a tour of the chief medical centers of the United States. Each member of the party had been asked in advance to indicate the men and institutions he most desired to see, and arrangements had been made accordingly. The outcome was gratifying. American scientific workers gained respect for the standards and ideals of the Japanese, who in turn said they had profited from observing the equipment, methods, and

personnel of institutions in the United States. Other visitors from foreign countries included: a health official from Hungary; another from Poland; and two professors of the medical school of the University of Hongkong, appointees to new university chairs which had been endowed by the Foundation.

From the United States, on the other hand, the Foundation sent one pathologist to Brazil, another to Siam, physicists to Chinese universities in Nanking and Tientsin, and a specialist in science teaching to the National Education Association of China. To the Peking Union Medical College went eight visiting professors: two from Johns Hopkins University, two from the Harvard Medical School, and one each from Columbia University medical school, the Rockefeller Institute for Medical Research, the University of Vienna, and the Central Institute of Brain Research in Amsterdam.

Safeguarding the Succession of Scientists

If the scientific "patrimony of humanity" is to be protected and enlarged there must be no break in the continuity of investigators and teachers. The leaders of today must train and inspire the younger students who will take over the responsibility for conservation and progress in the future. Because science is a world prod-

uct and a heritage of all the nations an interruption in the scientific succession of any leading country is of concern everywhere.

Thus the Foundation made an emergency grant for a three-year period when, at the close of the war, a great institute for research found difficulty, because of the diminished value of its endowments, in recruiting young assistants. A leading reason for establishing fellowships in mathematics, physics, chemistry, biology, and medicine, under the auspices of the National Research Council, was the fear that industrial and professional careers might draw promising investigators and teachers from the less financially attractive pursuit of pure science.

The plight of young medical scientists in the Central European countries and the Balkans has recently become so critical that the continuity of workers has been seriously threatened. In Germany especially the danger of a breakdown has aroused the anxiety of the scientific world. German medicine, for example, has contributed so much to the common fund of knowledge and technique that the turning of large numbers of young medical investigators to other pursuits would sooner or later affect medical progress as a whole.

The Rockefeller Foundation, in the interest primarily of modern medicine, therefore asked a

committee of German scientists to select promising younger workers who if they had no aid would be compelled to turn to other pursuits, and to appoint them to "resident fellowships." These provide small stipends together with sums for laboratory supplies and experimental animals. In 1923 the committee granted 194 of these fellowships. The trustees have authorized the extension of this plan to other countries in which similar conditions may be found.

Emergency Tools of Research and Teaching

A break in the succession of workers is not the only thing which may endanger the growth of science. Journals and books which report what others are doing are essential to prevent wasteful duplication and to provide suggestion and stimulus. Apparatus and consumable laboratory supplies must be available. In certain fields experimental animals of different kinds are vitally necessary.

Although the Rockefeller Foundation leaves relief work in the ordinary sense to other agencies, the post-war situation of many medical laboratories and libraries in Europe justified a policy of specific emergency aid. Funds were appropriated for laboratory supplies and for literature. Many institutions in low exchange countries were unable to pay for periodicals and

books published in the United States and England. In Central Europe and the Balkans there were gaps of five years or more in the files of journals from Western Europe and the United States.

During 1923 funds for laboratory supplies appropriated in previous years to three Austrian, one Hungarian, and two Czechoslovak medical schools continued to be spent. New sums were pledged for institutions in Yugoslavia, Poland, Czechoslovakia, Rumania, and Bulgaria. Medical periodicals to the number of 2,011 were supplied to 271 medical libraries in fifteen European countries: Austria, Belgium, Bulgaria, Czechoslovakia, Finland, France, Germany, Hungary, Italy, Poland, Portugal, Rumania, Russia, Switzerland, Yugoslavia.

Soon after the Japanese disaster it was possible to send promptly to Tokyo from the Peking Union Medical College not only a shipment of foodstuffs and clothing but certain equipment and supplies. Later the hospitality of the College laboratories was offered to the Japanese Government which sent a group of eight investigators who are remaining a number of months as guests of the College.

Professional Training for Health Workers

The Rockefeller Foundation fixes its attention upon permanent, constructive activities in the

fields of public health, medical education, and the premedical sciences. Experience clearly shows that the fundamental need in the progress of preventive medicine is a specialized personnel thoroughly grounded in the underlying sciences and familiar with the best methods of practical application and administration. The idea that an ordinary medical education fits a doctor to be a health officer is a serious error which does much harm. He needs additional graduate training for what is recognized as a special profession.

A mere enumeration of the subjects now included in the public health curriculum leaves no doubt about the necessity for specific training: (1) micro-organisms and various parasites, animals, and insects which cause or transmit diseases; (2) resistance and immunity, including vaccines and serums; (3) technical methods of controlling communicable diseases; (4) sanitation, including water supplies, sewerage, disposal of wastes, etc.; (5) chemistry and physiology of hygiene, including nutrition and diet and health habits; (6) mental aspects of disease, delinquency, and feeblemindedness; (7) legal relations of sanitation and hygiene; (8) maternity and child hygiene; (9) collection and interpretation of statistics of births, deaths, and sickness; (10) methods of organizing and administering public health work. Effective training also calls for

actual experience under expert guidance in the practical work of the public health laboratory, the bureau of vital statistics, the health-center, baby welfare station, the house-to-house service of the sanitary inspector, the public health nurse, and so forth.

For a number of years many medical schools in Great Britain, several universities in the United States, and a few schools of tropical medicine in Europe and the Orient gave courses which included parts of the program which is outlined above. But no institution had the resources to provide a well-rounded curriculum with satisfactory equipment and an adequate, specialized staff. To meet the growing demand for proper public health training the Foundation on the initiative of the International Health Board has endowed a School of Hygiene and Public Health at Johns Hopkins University, has enabled Harvard University to reorganize its health courses into a new School of Public Health, has agreed to provide land, buildings, and equipment for a School of Hygiene and Tropical Medicine in London, and has contributed substantially to institutes of public health in Prague and Warsaw. During 1923 in the development of this plan a half-million was appropriated to Harvard, an interim maintenance fund was voted to the London School, and building ap-

propriations were made to the Czechoslovak and Polish governments.

In addition to these comprehensive undertakings the Board supported a number of minor projects in the training of health officers. An appropriation was made for a special course for health officers in vital and public health statistics under the auspices of the Health Section of the League of Nations. Aid to an institute of hygiene in São Paulo, Brazil, was continued. A rural training base for staff members and fellows of the International Health Board was maintained at Andalusia, Alabama. An intensive course in medical zoology was given at Johns Hopkins University for a special group of the Board's representatives. Specific instruction in diagnosis and immunization for yellow fever was arranged at the Rockefeller Institute for Medical Research for staff members who will be detailed for service in West Africa. A contribution was made toward the continuance of a significant experiment by a state department of health in providing correspondence instruction in public health theory and practice for officers already in service.

The Rôle of the Trained Nurse

Created by the demands of war, the trained nurse became a necessity in peace. At the bed-

side in home and hospital, in the tuberculosis sanatorium, in the dispensary, in the maternity center, in the factory and store, in the crowded tenement district, in the isolated countryside, the nurse in her professional garb has become a part of contemporary life in the United States, in Great Britain, to some degree in continental Europe, and in other countries. The type of nurse, her social and professional status, her education and training, her salary, and her future outlook vary widely from country to country with differences in traditions, social ideals, educational standards, economic conditions, and religious influences. In one place she may be hardly more than a slightly sublimated servant; in another, intelligent, highly trained, well-paid, socially esteemed, enjoying a professional status; in a third, a devoted and experienced member of a religious order, giving her life to the service of the sick and the unfortunate; in a fourth, well-trained and respected but poorly paid and overworked.

The contacts of allied medical and hospital units during the war, the European services of the national Red Cross Societies, the activities of the League which these societies formed, and the work of various American organizations in France have all emphasized national differences in ideals and standards of nursing service and of

nurse training, have aroused interest and discussion, and have set at work international influences. It is to be hoped by exchange of ideas and experience and by interchanges of personnel through fellowships and visiting delegates that stimulus will be given to nations which have been slow to develop nursing services, and that useful suggestions will be made even to the countries which have regarded themselves as leaders in the movement.

The chief ideas which emerge from present discussions of nursing and nurse training seem to be: (1) the desirability of making the course of training more consciously educational and less of a routine apprenticeship; (2) the possibility by this means of shortening the course; (3) the importance of combining so far as possible bedside and public health training; (4) the need, for economic reasons, of creating a new type of nurse's assistant to serve under a registered nurse; (5) the essential value of the visiting nurse as a member of the public health staff; (6) an organization of the visiting nurse, the local dispensary, and the town hospital as a partial solution of the problem of medical and health care for rural populations; (7) the recognition that in predominantly Catholic countries hospital administration and to a large extent nursing service will remain a function of the religious orders with

which agencies for improving nursing standards must co-operate; and (8) that costs of training and salaries of nurses in a given country cannot rise far beyond a level fixed by general economic conditions and by rates of pay in comparable services.

Lending a Hand in Nurse Training

The Foundation's interest in nursing and nurse training has found expression (1) in encouragement and financial support of surveys and studies of nursing in the United States and in twelve foreign countries, (2) in aid for a demonstration of newer methods of training, and (3) in contributions to a few projects which aim at improving both general training courses and special courses for public health nurses.

Following a report made in 1922 after a detailed study of nursing education in the United States by a special committee supported by the Foundation, the trustees pledged in 1923 to Yale University an annual contribution for a five-year period toward an experiment and demonstration in the education of nurses. The essential features of the plan are a more systematically educational organization of instruction, a shorter period of training (twenty-eight months), and the inclusion of public health as an organic part of the course.

During 1923 the International Health Board contributed to the nurse training problem (1) by continuing to co-operate with the Health Department of Brazil in maintaining a general hospital training school, a special course for public health nurses, and a visiting nurse service in Rio de Janeiro; (2) by aiding in France in preparing health visitors, and in strengthening a few centers for training both bedside and public health nurses; (3) by lending to the Philippine Government a specialist who has helped in the organization of courses in public health nursing and the improvement of standards; and (4) by appropriation to the State Health Department toward an experimental correspondence course for public health nurses in Ohio.

The China Medical Board continued to maintain a nurse training school in the Peking Union Medical College (see pages 44–48) and to assist a number of hospitals in which nurse training is carried on.

In Europe studies of nursing education were continued until by the end of 1923 the conditions in ten countries had been observed. The fellowship plan (see page 11) was used to send French and Belgian nurses to England, a Siamese nurse to Peking, and to bring French, Polish, Czechoslovak, and Philippine nurses to America for further study.

Brazil's Final Bout with Yellow Fever

The outstanding feature during 1923 of the systematic, concerted attack upon yellow fever in which the International Health Board of the Rockefeller Foundation has been engaged since 1916 was the decision of the Brazilian Government to undertake a definitive campaign to eliminate the disease from the seed beds along the northern coast from Pará to Bahia where fever still appears from time to time. The Board warmly welcomed the invitation of the Brazilian authorities to have a part in this work. Noguchi of the Rockefeller Institute for Medical Research, the discoverer of the yellow fever organism, sailed for Brazil in November to make further studies and was soon followed by staff members with equipment and supplies.

This latest, and it is to be hoped final, bout with yellow fever in Brazil recalls the brilliant way in which the capital was freed from yellow fever under the leadership of that distinguished scientist and able administrator, Oswaldo Cruz. Graduated from the University of Rio de Janeiro, for four years a student and investigator at the Pasteur Institute in Paris, himself a bacteriologist of distinction, intelligent, resourceful, of compelling personality, an undaunted leader, he overcame all obstacles and opposition and made Rio de Janeiro as safe as it is beautiful.

Oswaldo Cruz had watched with eager interest the progress of yellow fever control. Finlay's early (1881) suggestion that the disease is spread by a mosquito, Ross's discovery (1897) that malaria is transmitted in this way, the indisputable proof by the United States Army Commission under Reed in Cuba (1900–1901) that the fever is communicated solely by the bite of the female Stegomyia mosquito, the success of Gorgas in wiping out yellow fever by mosquito control in Havana, in Cuba, and in the Panama Canal Zone, convinced the young Brazilian that the same methods could be successfully applied in his own city of Rio. Appointed Director of Public Health and loyally supported by President Alves, he gradually overcame traditional prejudices, professional opposition, the persistence of antiquated methods, and apprehensive interests of many kinds, until the annual deaths from yellow fever had fallen from 984 in 1902 to 0 in 1909.

Oswaldo Cruz's death in 1917 prevented him from following as he would have done with so much satisfaction the later success of the campaigns organized by the International Health Board; the formation of national yellow fever commissions in Mexico, Central America, and in Northern South America; Noguchi's discovery of the causative organism and his preparation of

Oswaldo Cruz

Fig. 3.—Lunchroom in consolidated rural school in Mississippi. Underweight and other evils of faulty nutrition common among rural school children are being largely corrected by the co-operation of county health departments and the school authorities

Fig. 4.—Child health clinic conducted by a county health department. None of the varied activities of a county health department are more effective in winning the enthusiastic support of the rural populations than the child and infant welfare work

a vaccine and a serum; the clearing-up (1918–1919) of Guayaquil in Ecuador, the chief endemic center; the exploratory expedition (1920) to the West Coast of Africa to investigate cases reported there; the elimination of the fever from Peru (1921); the quick control of incipient epidemics in Central America; and the active participation of the Mexican Government in the movement until by 1923 it was possible to make a most encouraging report. The situation in 1923 may be summarized as follows: No cases reported from Mexico, Central America, Ecuador, or Peru; outbreak in Colombia promptly put under observation; well-organized control measures under way in Northern Brazil and workers in training to resume study and observation along the coasts of West Africa from which cases of yellow fever have been reported.

Studying the Behavior of Malaria Mosquitoes

Control of malaria is not always so simple as a statement of the essential facts would make it seem. The disease can be transmitted only by certain mosquitoes (the Anopheles) which become infective after having fed upon the blood of a person who is suffering from the disease. By the use of quinine the parasites in the blood can be injured or killed, so that there is nothing for the mosquito to transmit. And if the mosquito

can be eliminated either by preventing its birth or by luring or screening it away, the dangerous circle may also be broken. When the two procedures can be made to reenforce each other effective control is made more certain. But variations in local conditions of mosquito breeding, in climate, in the character and distribution of populations, in occupations, in the nature of dwellings, in the presence of domestic animals, and in other factors create rather complicated problems which call for a combination of measures peculiarly adapted to each situation.

The International Health Board has been engaged in malaria control work since 1916. Special attention has been given to small towns and rural areas. A large number of demonstrations have shown that under fairly favorable conditions control is at once feasible and economical. But from the first the need of further facts has been recognized and staff members have devoted a good deal of time to studies of various kinds. During 1923 special malaria investigations were carried on in the United States, Brazil, Nicaragua, Palestine, the Philippine Islands, Salvador, and Porto Rico. In connection with control measures in many parts of the United States incidental observations of importance were also made.

The chief problems that were studied had to

do with the life history of malaria mosquitoes, e.g., the relative importance of marshes, grassy pools, ponds, and running streams as breeding places; the different varieties of Anopheles and their respective rôles in transmitting malaria; the habits of these different mosquitoes, their length of life, distances of flight, their food preferences as between human and animal blood, their tendency to seek darkened places, the possibility that they may hibernate; and many other pertinent questions. Methods of control were also studied. Destruction of larvæ by oiling, by Paris green, by fish; the covering of open wells and the installing of pumps; various kinds of drainage; the screening of houses and the use of mosquito bars; the driving of mosquitoes away by spraying unscreenable dwellings with creosote; the placing of animal barriers (cow stables or pig-pens) between mosquito breeding places and human habitations, were some of the measures with which various experiments and tests were made. A film which shows in detail the cause, transmission, effects, cure, and prevention of malaria was prepared during the year under the auspices of the International Health Board.

The Board continued to participate in demonstrations of malaria control in which local governments, state boards of health, and the

United States Public Health Service shared. In 1923, the program included sixty-six county-wide projects and eighty-two town demonstrations in twelve states. These demonstrations offered additional proof that under ordinary conditions many communities can reduce malaria to an almost negligible point, at per capita costs which are within the limits of local taxation.

"Parasites Lost and Parasites Regained"

This phrase, which reports the impression of a Fijian schoolboy after he had heard on the same day a talk about hookworms and an address on Milton, describes precisely what happens unless proper precautions are taken. The life cycle of the hookworm is a vicious circle. Eggs hatching in warm, moist soil become tiny wigglers which penetrate the skin of bare human feet or legs, are carried by the blood to the lungs through which they make their way by the throat into the alimentary canal, finally to attach themselves to the walls of the small intestine and there to thrive at the expense of their host. Their millions of eggs pass out to pollute the soil and to begin another cycle. An efficient vermifuge will dislodge the parasites but only the installation and use of sanitary latrines will prevent the recurrence of infestation.

Since 1910 when the Rockefeller Sanitary

Commission (later merged into the International Health Board) began hookworm work in the Southern States, campaigns have been carried on in many parts of the tropical and subtropical zones within which hookworm disease handicaps and enfeebles millions every year, reducing economic efficiency, causing unhappiness, and increasing mortality. The policy of the Board is to work only with governments, which (1) assume some part of the cost from the beginning, (2) agree to undertake the installation of latrines, and (3) promise to take over the entire responsibility for the project at the end of a given period. The usual plan of campaign includes (1) an infection survey, (2) an intensive demonstration of treatment, together with (3) the education of the public in the cure and prevention of the disease, (4) installing of latrines, and (5) resurveys at intervals to measure the degree of control which has been secured.

During 1923 the Board carried on hookworm work in Jamaica, Leeward Islands, Saint Lucia, Trinidad, Porto Rico, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, Salvador, Colombia, Dutch Guiana, Brazil, Australia, Fiji, Siam, Ceylon, India, and Mauritius. Resurveys were made in a few Southern States where hookworm control as such has been merged in the programs of county health units, as is also the

case in one or two states of Brazil. An invitation to co-operate with the Government of Mexico was accepted.

Simple as hookworm control appears, there is much still to be learned about the nature of the disease and methods of dealing with it. A special study of hookworm infestation in China by a parasitologist of the Johns Hopkins School of Hygiene and Public Health was financed by the Board. Staff members in all parts of the world made useful observations on the effects of a new vermifuge on the simplification of treatments, on the wearing of shoes as a protection, and on reported hookworm in pigs. One doctor found the Australian aborigines eager to take treatments in return for a gift of tobacco. The Board's film, "Unhooking the Hookworm," continued to prove useful in instructing the public.

Rural Health and Happiness

Hookworm disease and to a considerable extent malaria and typhoid fever are rural problems. Attempts to control these maladies have disclosed seriously backward health conditions in the American countryside. Typhoid is too often spread by flies, polluted wells, insanitary dairies, and undiscovered "carriers." Other communicable diseases are disseminated through the schools. The sanitation of farmhouses and

premises is defective. Examinations of rural school children frequently reveal more uncorrected physical defects than are found among town and city pupils. Maternity care and infant hygiene are sadly neglected. Popular knowledge about community health and about personal hygiene, i.e., food, ventilation, and exercise, is meager and misleading. While the general death-rate for the United States has steadily fallen, the decline has been relatively greater for urban than for rural populations. This state of things is not due to causes inherent in rural life but to a failure to extend to the open country the kind of sanitary and health services which have been developed in towns and cities.

The International Health Board has from the beginning of its work had as one aim the merging of specific hookworm measures into general health organizations with the county as the unit. This object was realized first in the South. Later the system spread to other parts of the country until in 1923, 230 counties in twenty-eight states maintained full-time health staffs. Toward the budgets of 173 of these counties the Board contributed. Such aid was in no sense designed permanently to take the place of public funds, but merely to help state and local authorities to prove to communities the value, feasibility, and eventual economy of modern public

health work. Similar aid was given for a limited number of rural units in New Brunswick (Canada), Brazil, and Czechoslovakia.

The average county health program includes: inoculation against typhoid, smallpox, and diphtheria; building of sanitary, fly-proof latrines; medical inspection of school children, with dental and tonsil clinics; maternity care and infant welfare; control of communicable diseases generally, including special attention to tuberculosis; and education of the community in public and personal hygiene. The typical full-time staff comprises a health officer, a sanitary inspector, one or more visiting nurses, and an office clerk. Motor transportation is provided. The average total annual cost of such a health service in the counties with which the Board is co-operating is $10,000.

The Doctor and Public Health

There are certain small nations which have low death-rates although there seems to be little done in the way of public health work as such. The low mortality is credited in part to favorable conditions of climate, food, and outdoor life, but it is said to be largely due to the influence of a well-trained and efficient medical profession which has the confidence of a public intelligent enough to choose and trust expert guidance.

Hence sanitation, quarantine, inoculation, and hygienic living become a part of daily routine and are fixed in the official machinery, social customs, and personal habits of the people. In all this the physicians, esteemed and trusted, play a leading part.

In all lands doctors are an essential part of the public health movement. They report births, causes of death, and cases of communicable disease. Upon them depends the introduction of new resources of diagnosis and treatment; for good or ill they educate their patients; they influence public opinion for or against preventive policies. No health service can prosper permanently unless it can command the loyal support of competent, local practicing physicians. The presence of physicians, poorly trained or with no interest in preventive medicine, or of representatives of various occult, empirical, or fraudulent cults is a serious handicap to sane and effective sanitation and hygiene in a city, town, or countryside.

It follows that medical education plays an essential part in the leadership and success of public health work. The Rockefeller Foundation is concerned, therefore, in aiding influential medical schools in many parts of the world to improve their facilities, to strengthen their teaching staffs, to perfect their methods, to main-

tain high standards, and gradually, in the words of a distinguished British medical authority, to "permeate the curriculum with the preventive idea." With respect to the last suggestion the International Health Board is supporting in a leading American medical school a plan which aims at getting every teacher to emphasize the preventive and community aspects of every topic with which he deals in his regular courses.

Medical Education Around the World

During 1923 the Division of Medical Education continued to gather facts about the medical schools numbering approximately 450 which are to be found in seventy-four countries of the world. Much of the material was secured by post, but a good deal was brought home by representatives who personally visited schools in Austria, Czechoslovakia, Germany, Hungary, Poland, Turkey, Hongkong, the Straits Settlements, Siam, Canada, England, Scotland, Wales, the Netherlands, Yugoslavia, Rumania, Bulgaria, Mexico, and Colombia. The data collected have to do with buildings, equipment, curriculum, staff, annual budget, and other significant points.

The returns so far received reveal a world-wide distribution of certain national influences. Thus British ideas and methods give character

in varying degrees to medical schools throughout the Empire, from Canada to the Cape and from Halifax through Hongkong to Bombay. The French or Latin tradition predominates in Southern and Western Europe, in Algeria and Syria, in Central and South America, and in Indo-China. German medicine is found to be fundamental in Central and Northern Europe and in Japan. In addition to these variations due to historical causes, the medical schools of the world display wide differences in resources, personnel, standards, and aims, due to varying racial, economic, governmental, and social conditions.

International co-operation between medical centers the world over is tending to make these differences less pronounced. One aim of the Foundation is to facilitate the contacts and intercommunications by which this international exchange of ideas is accomplished. By aiding schools to send official representatives abroad, by inviting commissions from one country to visit another (see page 15), and by stimulating an international exchange of professors, it is hoped that gradually fruitful interchanges and progressive adaptations will take place.

As a contribution to this end the Division of Medical Education has had in preparation during 1923 a series of bulletins in which well-known

professors in different medical schools in several countries will describe recent developments of buildings, equipment, and teaching methods in their respective departments. These will be sent to medical schools throughout the world. For example, a series of papers will deal with new or projected anatomical laboratories. In this service the Foundation seeks merely to serve as a means of disseminating promptly and accurately reports of new ideas and methods which have been found especially useful and effective in different medical schools of the world.

Since the Foundation began to have a part in medical education it has aided in varying degrees 117 medical schools in thirty-one different countries. The policy has been: (1) to help for the most part only such medical centers as are likely to make significant experiments, demonstrate progressive methods, and set standards which will have a wide influence; (2) to contribute only a part of the funds needed for a given project, with the understanding that the remainder will be provided from other sources; (3) to assume no responsibility for administration or supervision of institutions to which gifts have been made; but simply (4) to help faculties and trustees to hasten the realization of plans which they have worked out and in which they have genuine faith. Furthermore, (5) no assistance is ever

given to a medical school until after a representative of the Division of Medical Education has visited it and conferred personally with its teachers and administrators.

The kind of aid which the Foundation gives varies with the special circumstances of each situation. Here a contribution to a laboratory may seem most useful; there an addition to general endowment may be indicated; in a third case equipment and permanent income for a particular department may be deemed important to round out an otherwise well-balanced institution. Again, aid to premedical education may appear to be the first needed step; or for still another school traveling fellowships for teachers and a few visiting professorships may be desirable.

In accord with the policy which has just been described, offers were made to certain medical schools in the British Isles, contingent upon improvements or reorganization contemplated by their authorities. The medical education program of 1923 also included a gift of $500,000 to the University of Alberta (Canada) toward the endowment of its clinical teaching, a pledge of $250,000 toward a total of a million dollars for laboratories of anatomy and physiological chemistry at the University of Pennsylvania, and an authorization for the Director of the Division

of Medical Education to confer with the authorities of the King Edward VII Medical School of Singapore with a view to considering some form of co-operation with that institution.

A Medical Center in the Orient

The visitor to Peking today who has had no warning in advance is surprised to find on the site of what was once the palace of a Chinese prince, a group of beautiful buildings which make a somewhat puzzling impression. At first glance they seem to be of classic Chinese architecture. The curved roofs of glazed tiles, the elaborately decorated eaves, the formal courts, the white marble steps and balustrades, the main gate guarded by archaic lions—all seem characteristically Chinese. But on closer examination other features are noted. The buildings are of brick, two, three, or even four stories high. The windows are large and glazed. Yonder rises a tall chimney evidently belonging to a power-house. Half hidden at one side one recognizes the storage tank of a gas-plant. Here evidently is an institution of the West which has assumed some outer aspects of the East. It is the Peking Union Medical College, built, equipped, and maintained with funds supplied by the Rockefeller Foundation through the China Medical Board.

In these laboratories, classrooms, and hospital pavilions teaching and research are being carried on in the modern scientific spirit, by well-trained men and women from many parts of the world. The seventy-eight members of the medical school and hospital staffs who hold medical degrees represent thirty-eight medical colleges of eleven different countries. In increasing numbers Chinese scientists and doctors are being welcomed as members of the faculty and advanced to positions of responsibility. In a premedical course students are being prepared to enter the regular undergraduate medical school. A school of nursing is a part of the plan. Graduate students, Chinese physicians, and medical missionaries on furlough from their stations, are pursuing special studies or serving as voluntary assistants. From time to time brief intensive courses are organized in medicine, surgery, the clinical specialties, the fundamental laboratory sciences, and roentgenology for groups of doctors who wish to keep abreast of recent progress. Visiting professors from America and Europe (see page 16) have a share in these courses as well as in other teaching, and bring to the institution the stimulus of their ability, experience, personality, and prestige. In October, 1923, the total number of registered students was 176, distributed as follows: medical school 53, premedi-

cal school 60, nurses' training school 16, graduate students 47. This enrollment represented 69 preparatory schools in China and 6 in foreign countries. The last group will increase greatly during the teaching year. In the year July 1, 1922, to June 30, 1923, the number of graduate students was 131.

The main scientific and professional aims of the College are: (1) to provide an undergraduate medical training of high standard, (2) to afford facilities to physicians for graduate work, (3) to give special preparation to prospective medical teachers and investigators, (4) to offer opportunities to staff members and advanced students for research, especially with respect to diseases of the Orient, and (5) in various ways to increase popular knowledge of the methods and meaning of modern medicine. The College is a development of an institution founded under missionary auspices. It seeks to perpetuate ideals of high character and loyal service and to work in sympathetic relations with the missionary movement and with the Chinese themselves.

In spite of the heavy burden thrown upon the faculty by the organization and administration of a new institution, a gratifying amount of significant investigation has been done. The scientific papers by members of the staff, collected by the College and issued in an annual

volume, have won recognition for the institution as an important center of medical progress. Among a number of investigations reported upon during 1923, a study of kala-azar deserves mention for the thoroughness of the work and the value of the results.

Obviously a modern medical school cannot prosper in isolation. Normally it must have close relations with the educational system; it must command the confidence of the medical profession and must win the support of public opinion. In China peculiar conditions must be met. The national system of education is in process of development. Secondary and higher education has hitherto been provided to a large extent by schools and colleges under foreign control. The number of well-trained Chinese doctors is small. Full appreciation of Western medicine is confined to a relatively few educated Chinese. The China Medical Board has, therefore, aided medical schools, contributed to hospitals as centers of training for doctors and nurses and as a means of education for the public, has co-operated in premedical education, and has granted fellowships for study both in China and in foreign countries. In 1923 contributions were made toward a women's department in the medical school of Shantung Christian University, maintenance funds were continued to that

institution and to premedical work and nurse training at the Hunan-Yale medical school at Changsha, a gift was made to Canton Christian College for a science laboratory, and pledges were fulfilled by continuing appropriations to twenty-five hospitals. A number of smaller items of aid and service in China are reported in the following section.

Consultation and Field Service

Expert counsel is often more needed than large sums of money. In many cases the lending of a trained specialist to a government department or an institution may insure the efficient use of funds that are already at hand. Again, a sanitarian or a medical authority may help a ministry of health or a medical school to demonstrate the feasibility of an innovation for which support will be forthcoming.

Thus during 1923 the International Health Board, in addition to services already mentioned, lent one adviser in industrial hygiene and another in sanitary engineering to the Health Department of the Commonwealth of Australia, gave advice and aid in developing public health laboratory service in seven American states and in five Central American countries, and stimulated the growth of sanitary engineering divisions in three states, of an epidemiological divi-

sion in another, and of a bureau of vital statistics in still another. The General Director during tours in the United States and Europe and members of his staff in many countries to which they were assigned put their knowledge and experience at the service of government officials and of others concerned with various phases of public health work.

The China Medical Board besides lending consultants in premedical education maintained in Peking an architectural service which was able to assist Chinese, Siamese, and mission hospitals and educational institutions in planning buildings wisely and economically and helped seven hospitals to select and instal X-ray equipment which was appropriate and serviceable under the existing conditions. Aid for the translation of Western medical books into the Chinese language was continued and a pledge was made toward the establishment of a biological supply bureau which will gather laboratory material for use in biology courses and distribute it to schools and colleges.

Working with Other Agencies

The Foundation tries to avoid duplication of machinery. It supports a number of activities related to public health and medical education by making appropriations to agencies which are

prepared to do the work. There follows a list of these organizations with a brief statement about the Foundation's co-operation with each.

Committee on Dispensary Development (under the auspices of the United Hospital Fund of New York City). Funds supplied for a program which comprises: information service, studies, and demonstrations on dispensary administration including an experiment in self-support for an out-patient service at the Cornell University Medical College.

National Committee for Mental Hygiene. Continued contribution toward studies of the custodial care of the feebleminded and the insane.

New York Academy of Medicine. Annual appropriation for educational work of the Academy pending the completion of its new building when the income from the endowment fund of $1,125,000 pledged by the Foundation will be available.

National Health Council. A small contribution toward an experiment in closer co-operation between ten leading voluntary health associations.

American Medical Association. The continued assumption of half the deficit involved in the publication of a Spanish edition of the Association's *Journal.*

Concilium Bibliographicum. A gift to the

budget of this Swiss bibliographical service in the fields of biology and the medical sciences pending a decision as to the future of the institution.

Council on Health Education in China. An appropriation for the presentation of modern medicine as a career to students in colleges and secondary schools.

National (Chinese) Association for Advancement of Education. Payment of the salary of a Western expert on science teaching, and a promise to contribute toward a summer institute for science teachers.

American Academy in Rome, Committee of Reference and Counsel, New York Association for Improving the Condition of the Poor. Payments made on pledges given in 1914 for a ten-year period.

Applications for Aid

There were recorded in the executive offices of the Foundation 809 applications for aid which did not fall within the scope of policies at present governing its work and were therefore declined. In addition, a large number of tentative inquiries were made of officers and staff in the field. The Foundation consistently declines to make gifts or loans to individuals, to contribute to the building or maintenance of churches, hospitals (except in connection with educational programs), and other local institutions, or to support cam-

paigns to influence public opinion on social or political questions. Of the 809 applications declined, 525 were for such local and miscellaneous purposes, forty-eight were proposals in the field of general education in which the Foundation is not at work, and 236 were projects in public health and medical education which are outside the Foundation's programs in those fields. A record of all applications formally declined is kept for the trustees of the Foundation and for reference. For obvious reasons of fairness and courtesy, the names of applicants and the details of their requests are not made public.

Finances for 1923

The accompanying table presents a summary of receipts and expenditures for 1923. The income accruing from investments was nearly nine millions. Almost all of this was required to meet the obligations which came due during the year. Of the more than six millions carried over from 1922 more than five and a half were subject to call in fulfilment of outstanding pledges. The remainder available for transfer to the 1924 budget and subject to appropriation for that year was somewhat more than one million. Details of expenditures for 1923 will be found on pages 64–66. A still fuller financial statement appears in the Treasurer's Report, pages 301–365.

TABLE I: RECEIPTS AND DISBURSEMENTS IN 1923

Receipts		*Disbursements*		
Balance from 1922	$6,290,862	Public Health		$3,174,268
Contribution for study of hookworm	45	Medical Education		4,911,010
Refunds on appropriations	21,793	Miscellaneous		155,928
Income during 1923	8,822,879	Administration		189,869
				$8,431,075
		Balance		
		Payable on 1923 and prior appropriations	$5,602,183	
		Available for 1924 appropriations	$1,102,321	6,704,504
	$15,135,579			$15,135,579

The Comradeship of Science

Science as a common fund to which all nations contribute and from which each may freely draw grows steadily in volume and in value. The world is dotted with centers of research and with individuals who are in quest of truth. These scientists are in frequent communication through the printed page, the visits of fellow workers, and international congresses. One can trace the outlines at least of a vast co-operation which tends more and more to ignore national frontiers. In this team-work of the nations the medical scientists and the sanitarians have an inspiring part. They not only feel the thrill of discovery and of high adventure in coping with the problems which challenge their knowledge and skill,

but they know the satisfaction of safeguarding life and of alleviating suffering. They have too a sense of comradeship in enriching "the patrimony of humanity" and in attacking a common enemy. This spirit not only hastens the progress of science; it offers hope of more sympathetic insight and closer accord in world relations. By promoting the migration of scientists and administrators, by helping to diffuse more rapidly new ideas, by strengthening world centers of teaching and research, in short by fostering medical science and public health as forms of international co-operation, the Rockefeller Foundation seeks to fulfil the purpose of its charter, "the well-being of mankind throughout the world."

THE ROCKEFELLER FOUNDATION

Report of the Secretary

To the President of the Rockefeller Foundation:

Sir:

I have the honor to submit herewith my report on the activities of the Rockefeller Foundation for the period January 1, 1923, to December 31, 1923.

Respectfully yours,

EDWIN R. EMBREE,

Secretary.

SECRETARY'S REPORT

The review by the President outlines the policies by which the Rockefeller Foundation is being guided in its work, sketches its present program, and describes the results aimed at and accomplished during the year 1923. The following report depicts the organization and the agencies through which these results were reached, and outlines the methods by which the programs of the several departments were carried out.

Organization

The following are the members and officers of the Rockefeller Foundation for 1924:

MEMBERS

John G. Agar	Wickliffe Rose
Wallace Buttrick	Julius Rosenwald
John W. Davis	Martin A. Ryerson
Simon Flexner	Frederick Strauss
Raymond B. Fosdick	George E. Vincent
Vernon Kellogg	William Allen White
John D. Rockefeller, Jr.	Ray Lyman Wilbur

EXECUTIVE COMMITTEE

George E. Vincent, *Chairman*

Wallace Buttrick	Vernon Kellogg
Raymond B. Fosdick	John G. Agar

Edwin R. Embree, *Secretary*

OFFICERS

John D. Rockefeller, Jr.	*Chairman, Board of Trustees*
George E. Vincent	*President*
Edwin R. Embree	*Secretary*
Norma S. Thompson	*Assistant Secretary*
L. G. Myers	*Treasurer*
L. M. Dashiell	*Assistant Treasurer*
Robert H. Kirk	*Comptroller*
Chase Andrews	*Assistant Comptroller*
C. C. Williamson	*Chief of Information Service*

The Foundation holds regular meetings in February, May, and December. The executive committee meets frequently during the intervals to execute programs within general policies approved by the trustees. Nineteen meetings of the executive committee were held during 1923.

Departmental Boards

The Foundation accomplishes its work largely through departmental organizations that are devoted to special functions and depend upon the Foundation for funds. These with their members and officers are:

INTERNATIONAL HEALTH BOARD

George E. Vincent, *Chairman*

Wallace Buttrick	Vernon Kellogg
David L. Edsall	T. Mitchell Prudden[1]
John G. FitzGerald	John D. Rockefeller, Jr.
Simon Flexner	Wickliffe Rose
Raymond B. Fosdick	Victor C. Vaughan
Edwin O. Jordan	William H. Welch

Edwin R. Embree, *Secretary*

Florence M. Read, *Assistant Secretary*

[1] Died April 10, 1924.

F. F. Russell, M.D.	*General Director*
John A. Ferrell, M.D.	*Director for the United States*
Victor G. Heiser, M.D.	*Director for the East*
H. H. Howard, M.D.	*Director for the West Indies*
Selskar M. Gunn[1]	*Director of the Paris Office*

CHINA MEDICAL BOARD

George E. Vincent, *Chairman*

Wallace Buttrick	Vernon Kellogg
Simon Flexner	Paul Monroe
Raymond B. Fosdick	John R. Mott
Frederick L. Gates	Francis W. Peabody
Frank J. Goodnow	John D. Rockefeller, Jr.
Roger S. Greene	Wickliffe Rose

William H. Welch

Edwin R. Embree, *Secretary*

Margery K. Eggleston, *Assistant Secretary*

Roger S. Greene	*Director*
Henry S. Houghton	*Acting Resident Director in China*

DIVISION OF MEDICAL EDUCATION

Richard M. Pearce, M.D.	*Director*
Alan Gregg, M.D.	*Associate Director*
William S. Carter, M.D.	*Associate Director*
Henry O. Eversole, M.D.[1]	*Director of the European Office*

DIVISION OF STUDIES

Edwin R. Embree	*Director*
F. Elisabeth Crowell[1]	*Director in Europe for the Education of Nurses and Health Visitors*

Assistance to Other Agencies

In addition to the work carried out through the departmental organizations described above, the Rockefeller Foundation has contributed during the year to the accomplishment of work undertaken by other and unaffiliated organizations.

[1] Address: 22, Rue de l'Elysée, Paris.

Following this paragraph is a summary of payments made by the Rockefeller Foundation for all purposes during the year 1923. This tabular summary outlines, in terms of expenditures, the work described in terms of aims and results in the President's Review. In many instances these payments involved sums expended on account of appropriations made in former years. On the other hand, they represent in some instances but partial payments on many of the appropriations, made during 1923, which will provide for continuing work during succeeding years. For a full statement of the finances of the Foundation, see the Report of the Treasurer, pages 301 to 365.

TABLE 2: SUMMARY OF THE EXPENDITURES OF THE ROCKEFELLER FOUNDATION FOR THE YEAR 1923

I. PUBLIC HEALTH	
A. International Health Board	
1. Regular program in control of Hookworm, Malaria, and Yellow Fever, and in County Health and Laboratory Service	$1,457,486
2. Tuberculosis in France	175,698
3. Fellowships and Public Health Education	441,998
4. Administration	257,329
B. Studies and Demonstrations	
1. Mental Hygiene	52,153
2. Hospital, Dispensary Service, and Nursing	161,504
C. Schools of Public Health	
1. Harvard University	618,750
D. Other Public Health Education and Demonstrations	
1. National Health Council	9,350
	$3,174,268

II. MEDICAL EDUCATION

A. China Medical Board	
1. Peking Union Medical College	
(a) Buildings and Equipment	$31,121
(b) Operation	980,985
2. Aid to Medical and Premedical Schools and to Hospitals	241,384
3. Fellowships and Scholarships	32,057
4. Administration	69,395
B. Canadian Medical Program	1,596,592
C. London Medical Center	621,472
D. University of Chicago	1,046,952
E. Columbia University	8,333
F. Central Europe—Journals and Apparatus	60,316
G. Pasteur Institute	20,000
H. Fellowships for Medical Scientists	84,261
I. American Medical Association (toward publishing Spanish Edition of Journal)	5,586
J. Studies in Medical Education, Visiting Commissions and Exchange Professors	56,862
K. Administration—Division of Medical Education	55,694
	$4,911,010

III. MISCELLANEOUS

A. American Academy in Rome (payment on ten-year pledge made in 1914)	$10,000
B. Committee of Reference and Counsel of the Annual Foreign Missions Conference of North America (payment on ten-year pledge made in 1914)	12,500
C. New York Association for Improving the Condition of the Poor (payment on ten-year pledge made in 1914)	15,000
D. Concilium Bibliographicum, Zürich	20,000
E. National Research Council	
1. Fellowships in Physics and Chemistry	83,558
2. Fellowships in the Biological Sciences	13,870
F. National Information Bureau (membership for 1923)	1,000
	$155,928

IV. ADMINISTRATION

A. Maintenance of Executive Offices and Treasurer's Office	$186,937
B. Furniture and Fixtures, and Books	2,932
	$189,869
	$8,431,075

Funds and Property

As of December 31, 1923

PRINCIPAL FUNDS		
General Fund		$165,204,624
Special Funds		
Gifts of Laura S. Rockefeller	$50,000	
Gifts of John D. Rockefeller	37,000	87,000
		$165,291,624
LANDS, BUILDINGS, AND EQUIPMENT		
In China: Medical School Lands, Buildings, and Equipment	$8,828,657	
In New York: Furniture and Equipment of Offices	35,159	$8,863,816
UNDISBURSED INCOME		
General Income (For offsetting liabilities see below)		$6,704,503
Special Income Accounts		
Estate Laura S. Rockefeller		106
		$6,704,609
UNPAID APPROPRIATIONS AND PLEDGES		
Balance due on appropriations payable in 1923 and prior years		$5,602,183
Appropriations and pledges which become effective in 1924 and following years:		
1924	$9,334,820	
1925	2,670,126	
1926	1,830,655	
1927	627,495	
1928	447,295	
1929	126,500	
1930	79,709	15,116,600
		$20,718,783

INTERNATIONAL HEALTH BOARD

Report of the General Director

INTERNATIONAL HEALTH BOARD

Report of the General Director

To the President of the Rockefeller Foundation:

Sir:

I have the honor to submit herewith the report of the International Health Board for the period January 1, 1923, to December 31, 1923.

Respectfully yours,

FREDERICK F. RUSSELL,
General Director.

INTERNATIONAL HEALTH BOARD

OFFICERS AND MEMBERS

George E. Vincent, *Chairman*
Frederick F. Russell,[1] *General Director*
Hermann M. Biggs[2]
Wallace Buttrick
David L. Edsall
John G. FitzGerald
Simon Flexner
Raymond B. Fosdick
Edwin O. Jordan
Vernon Kellogg
T. Mitchell Prudden[3]
John D. Rockefeller, Jr.
Wickliffe Rose
Victor C. Vaughan
William H. Welch

Edwin R. Embree, *Secretary*
Florence M. Read, *Assistant Secretary*

[1] See footnote 2, p. 73.
[2] Died June 28, 1923.
[3] Died April 10, 1924.

PERSONNEL OF STAFFS DURING 1923[1]

ADMINISTRATIVE STAFF

FREDERICK F. RUSSELL,[2] M.D., *General Director*
JOHN A. FERRELL, M.D., *Director for the United States*
VICTOR G. HEISER, M.D., *Director for the East*
HECTOR H. HOWARD, M.D., *Director for the West Indies*

FIELD STAFF[3]

AUSTRALIA

(including Papua and Late German New Guinea)

W. A. SAWYER	Consultant in Public Health to the Commonwealth Department of Health
W. C. SWEET	Hookworm control
A. J. LANZA[4]	Industrial hygiene
F. F. Longley[4]	Sanitary engineering

BRAZIL

L. W. HACKETT (to March 7)	Direction of work in Brazil
G. K. STRODE (Director of work in Brazil from March 8)	Hookworm control
N. C. DAVIS	Hookworm control
J. H. JANNEY, JR.	Organization of county health departments
M. F. BOYD	Malaria surveys and control
E. H. MAGOON[4]	Malaria surveys
MRS. ETHEL PARSONS[1]	Public health nursing service
J. H. WHITE[4]	Yellow fever control
E. J. SCANNELL[4]	Yellow fever control
G. J. CARR[4]	Yellow fever control
A. F. MAHAFFY[4]	Yellow fever control
H. R. MULLER[4]	Yellow fever research

[1] Personnel employed by Government in co-operative work not listed.
[2] Dr. Russell became General Director on March 1, 1923, when Mr. Wickliffe Rose, the former director, became President of the General Education Board and the International Education Board.
[3] Names are listed under each country in which the staff members served for any part of the year.
[4] Special Staff Member.

A. M. Walcott [1]	Yellow fever control
L. C. Smith [1]	Yellow fever control

CEYLON

J. F. Docherty	Hookworm control

CHINA

J. B. Grant	Services lent to Peking Union Medical College as Associate Professor of Hygiene and Public Health Public health surveys

COLOMBIA

F. A. Miller	Hookworm control Yellow fever control
W. M. Monroe (resigned)	Hookworm control
J. H. White [1] (April to June)	Yellow fever commission
Henry Hanson [1]	Yellow fever control
L. H. Dunn [1]	Yellow fever control

DUTCH GUIANA

W. C. Hausheer	Hookworm control
Hugo Muench, Jr.	Hookworm control

FIJI

S. M. Lambert	Hookworm control

FRANCE

S. M. Gunn	In charge of Paris Office
Miss F. E. Crowell [1]	Public health visiting

GUATEMALA

J. E. Elmendorf, Jr.	Hookworm control Public health laboratory service

HONDURAS

D. B. Wilson	Hookworm control
R. M. Taylor [1]	Public health laboratory service

INDIA

J. F. Kendrick	Hookworm control

[1] Special Staff Member.

JAMAICA

B. E. Washburn	Hookworm control
D. L. Sisco (resigned)	Hookworm control

MAURITIUS

G. G. Hampton	Hookworm control
C. H. Yeager	Hookworm control

MEXICO

J. H. White [1] (January)	Yellow fever control
M. E. Connor	Yellow fever control
E. I. Vaughn	Yellow fever control
E. J. Scannell [1]	Yellow fever control
A. M. Walcott [1]	Yellow fever control
L. C. Smith [1]	Yellow fever control

NICARAGUA

D. M. Molloy	Organization of public health activities
	Hookworm control
F. E. Hulse [1]	Malaria control investigations
E. H. Magoon [1]	Sanitary engineering
E. M. Knights [1] (resigned)	Public health laboratory service

PALESTINE

P. S. Carley	Malaria survey
J. J. Mieldazis [1]	Malaria survey

PANAMA

Louis Schapiro	Hookworm control

PHILIPPINE ISLANDS

C. N. Leach	Public health administration
W. D. Tiedeman [1]	Malaria survey
Miss Alice Fitzgerald [1]	Public health nursing service
G. R. Lacy [1]	Assistant to Director, Bureau of Science

PORTO RICO

R. B. Hill	Hookworm control
J. L. Rice [1] (resigned)	Hookworm control
W. C. Earle	Hookworm control
H. W. Green [1] (resigned)	Malaria control investigations

[1] Special Staff Member.

ST. KITTS

Hugo Muench, Jr.	Hookworm survey

SALVADOR

C. A. Bailey	Hookworm control

SIAM

M. E. Barnes	Hookworm control
H. R. O'Brien	Hookworm control

TRINIDAD

J. L. Hydrick	Hookworm control
W. C. Hausheer	Hookworm control

UNITED STATES

Alabama

W. G. Smillie	Director of training station
H. W. Nightingale[1] (resigned)	Malaria control

Georgia

S. T. Darling	Director of Leesburg station for field studies in malaria control
F. W. O'Connor[1]	Field studies in malaria control

Iowa

Jas. Wallace[1] (resigned)	Organization of county health departments

Kansas

Louis Schapiro	Organization of county health departments

Louisiana

A. R. Wingate[1] (resigned)	Malaria control

Mississippi

H. A. Johnson[1]	Malaria and sanitary survey
A. D. Tisdale[1]	Malaria and sanitary survey

North Carolina

H. A. Taylor	Malaria control investigations

Oregon

A. J. Warren	Organization of county health departments

[1] Special Staff Member.

Tennessee

F. C. Caldwell	Diagnostic laboratory service

Texas

A. P. Harrison [1] (resigned)	Organization of county health departments
E. W. Steel [1] (resigned)	Malaria control

Virginia

G. C. Payne	Epidemiological service
H. P. Carr	Epidemiological service

AT HOME OFFICE

C. W. Wells	In charge of fellowships
W. P. Jacocks	Assistant to Director for United States
P. W. Covington	Assistant to Director for United States (headquarters, Salt Lake City)

ON STUDY LEAVE

C. A. Bailey
M. E. Barnes
P. W. Covington
G. G. Hampton (died December 10, 1923)
R. B. Hill
J. F. Kendrick
D. M. Molloy
G. C. Payne
F. L. Soper

ON SICK LEAVE

W. T. Burres (died December 15, 1923)

AT TRAINING STATIONS

George Bevier
G. J. Carr [1]
H. P. Carr
P. F. Russell
A. F. Mahaffy [1]

YELLOW FEVER ADVISORY COUNCIL [2]

Henry R. Carter, M.D., Assistant Surgeon General, United States Public Health Service

Hideyo Noguchi, M.D., Rockefeller Institute for Medical Research

Joseph H. White, M.D.[1], Assistant Surgeon General, United States Public Health Service

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[1] Special Staff Member.

[2] Not Staff Members; appointed to serve in an advisory capacity.

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APPENDIX

INTERNATIONAL HEALTH BOARD

It is a generally accepted view that the care of the health of a people is one of the functions of the state, and that a government may be judged in part by what it does in sanitation, hygiene, and public health. Yet there is a recognized field for voluntary effort in promoting public health. Official organizations, as a rule, must limit their programs to those activities whose worth is thoroughly established in the public mind and for which appropriations are guaranteed; it is difficult to obtain official funds for pioneer work so long as there is any question as to the value of the new project. Voluntary agencies are not bound by rigid statutes or annual appropriations for limited activities and hence have a flexibility which permits them to work productively in unexplored fields and to be of assistance in emergencies.

I

Function of the Voluntary Health Agency

Here, therefore, is the province of the voluntary agency: it can and should keep ahead of official health practice in each locality, advancing steadily to newer fields as each of its demonstrations proves successful and the constituted

authorities are ready to take full responsibility for the activity. The International Health Board has been conducted on such principles, and it does not feel that any given demonstration has been successful unless its assistance ceases to be needed within a reasonable time. Any project which is not absorbed into the official health service is obviously unsuited to the time or the place.

There is no end to fresh opportunities. Each new discovery in medicine may have an application in public health. The discovery of insulin makes new work for public health laboratories in the special examinations required by physicians for their patients and in the standardization of the purity and potency of the drug employed. Studies of the function of the thyroid gland have led health departments into the field of goitre prevention. Many such instances might be cited as an indication that voluntary organizations will have for many years to come the same important pioneering function that they have at the present time.

Universities, both state and private, and schools of hygiene and public health are in a sense voluntary agencies. They not only furnish the trained personnel for the public services, but their faculties through their researches furnish new information and, from time to time, new

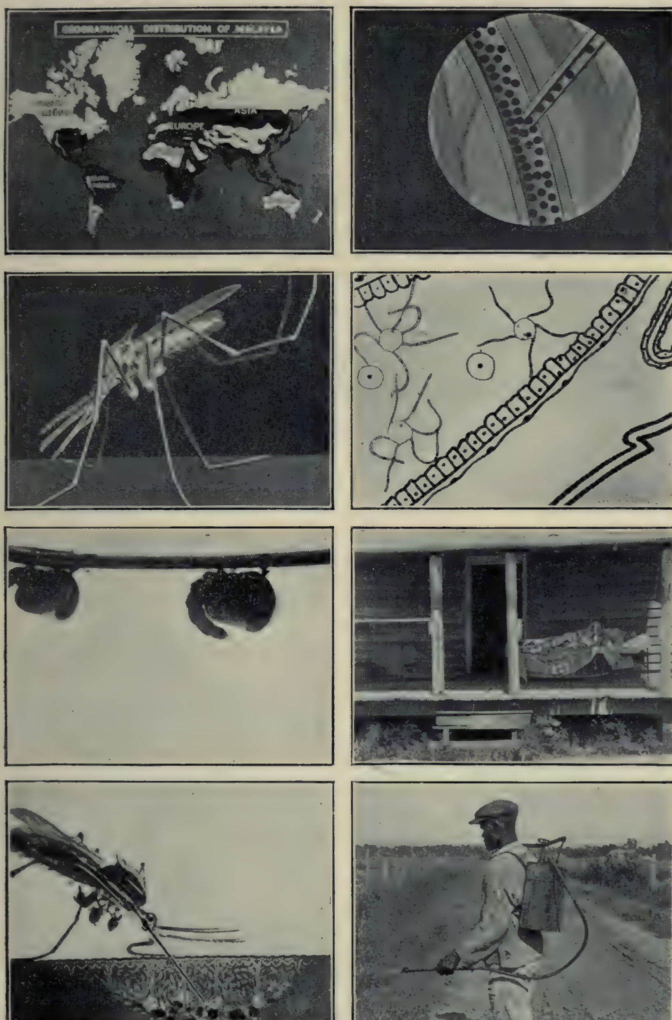


Fig. 5.—Scenes from the malaria film produced by the Board

Fig. 6.—A plantation of young cinchona trees on the slopes of a volcano in Java. Quinine, which is the only effective remedy known for malaria, is derived from the bark of various species of this tree. Although quinine was first isolated in 1820, the use of cinchona bark, or "Peruvian" bark, as a cure for malaria can be traced as far back as 1638

Fig. 7.—A passenger train in Mauritius—one of the numerous types of conveyance encountered by members of the Board's field staff in their hookworm work

principles to guide the man in the field. Research is necessary to the development of sound practice.

Field Research

Neither the official health organization nor the university is, as a rule, able to conduct much research in the field, though there are notable exceptions, such, for example, as the work of Laveran and Ross in malaria, of Walter Reed and Noguchi in yellow fever, of Biggs and Park in tuberculosis and diphtheria. But there is a form of research, perhaps not sufficiently cultivated in the past, which must be done in the field, by men in intimate contact with the people whose lives are affected—men who have the poise and judgment that only drilling in the science laboratories can give, but who see the problem as a human one and know the habits, the thoughts, and even the prejudices of the people.

In this form of research, which tests in the field the abstract truths of the university laboratory, the International Health Board as a voluntary agency can continue to contribute to the progress of public health.

Public Health Demonstrations

It is a well-recognized fact that practice in public health is years behind our knowledge.

There is not so much a lack of information as to the cause of disease, or in many cases, of direct and positive means of prevention, but there is a lack of administrative machinery for putting scientific knowledge to work in an effective manner and at a reasonable cost, within the capacity of the community to pay. It is in such situations that opportunity is found for pioneer demonstrations which show what public health means; what it promises for individual welfare and happiness and for general economic betterment; what it costs; and how it will affect the future of the community.

The American farmer, like the agriculturist in all countries, is a conservative, slow to adopt new ideals, but ready to back them to the limit of his power when he understands them. It is this attitude of the farmer which has given stability to our institutions. To reach him and to bring to his attention the problem of public health and means for its solution, we have at hand a method which has proved successful in another field. The Department of Agriculture has for years followed the custom of sending into each county a farm demonstrator, who meets the farmer on his own ground and shows him from day to day and year to year the best and most productive methods of working his land. The farmer learns by seeing and doing and is proud of his

increasing knowledge and prosperity. Modified to suit the purpose, the demonstration system has been used in public health.

II

Development of Rural Health Organizations

Health departments in the United States developed first in the larger centers of population. In the northeast every city and town of any size has had for many years its municipal department of health, but in the rural sections little was done until recently. The most promising of the present health organization projects has developed in the rural regions of the South, where the relationship of the International Health Board and its predecessor, the Rockefeller Sanitary Commission, to state and local health organizations, has been of longest standing. The political unit selected for this plan is the county, rather than the town or the village, because in most instances the county is large enough and has sufficient resources to warrant the employment of a full-time health officer and a suitable staff. It was in 1908 that Jefferson County, Kentucky, appointed the first full-time rural health officer; North Carolina and Washington followed in 1911; since then every year has witnessed an increasing growth of the movement.

At first it was believed that the services of a full-time health officer alone would be sufficient for the maintenance of a rural health program, but each year's experience has shown that there is needed, in addition, a staff of non-medical assistants. These may vary in number according to the resources of the people. The minimum unit now giving satisfactory service consists of a physician as health officer, a sanitary inspector, a public health nurse, and an office assistant. In most rural communities in the United States such an organization can be supported on a budget of $10,000 per annum. As the work grows and the community increases its support, additional nurses, inspectors, and laboratory facilities can be employed without greatly increasing the overhead expenditure or changing the plan of organization.

Demonstrations in which the county and state authorities do not participate to a substantial degree from the inception of the project are not likely to be successful; the county or state must be sufficiently interested to risk something, to follow the plan critically, to take over the cost of the work gradually but steadily, and within a reasonable period to assume the entire burden of direction and expense. Fortunately demonstrations are not necessary in every county but they must be sufficiently numerous to cover the diverse

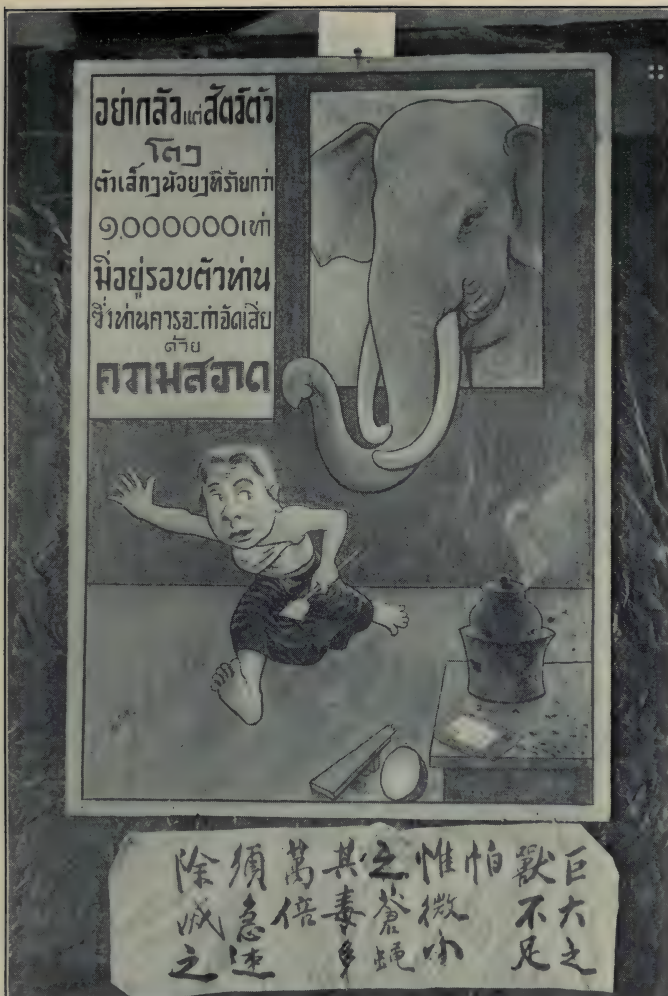


Fig. 8.—A prize poster used in the Red Cross health exhibit held in Bangkok, Siam. The cook flees in terror when an elephant pokes his inquisitive trunk through the window. The legend, in Siamese and Chinese, reads: "Very much afraid of an elephant, but she pays no attention to flies and rats, which are much more deadly"

Fig. 9.—Group assembled for hookworm treatment, India

Fig. 10.—A school "conference" assembled in Panama for hookworm treatment

conditions that are found in different parts of this large country.

County Health Organization

In organizing a health unit in a county, the health officer surveys his area, determines the most pressing problems, and, in consultation with the state health officer and his aides, works out a program for their solution. In every county the health officer finds that he has certain fields of activity, such as the education of his community in public health,—his most important and fundamental duty,—demonstrations in sanitation, the provision of a pure supply of water and milk, medical inspection of school children, organization of maternity and infant welfare centers, and the creation of facilities for suitable care of such diseases as tuberculosis, trachoma, the venereal trio, and for the correction of remediable defects in children. In the South and in the tropics he will have to combat intestinal parasites, malaria, and dengue; in some regions leprosy and yaws—in fact, in each area the disease that the survey shows to be the most important. In all places, he will have to collect statistics and keep records in order to have a measuring stick to show progress or lack of it; he will have to provide for laboratory diagnosis and the study of special or new prob-

lems solvable only by exact biological laboratory methods; and he will have to study his field so as to be prepared to give advice to the individual or the community.

It is perhaps too much to expect any man to do all these things and do them well; for this reason and others it is necessary to have in each state or country a central or guiding bureau to give special attention to county health departments and to act as a clearing house for their personnel and affairs. The director of such a bureau may stimulate the organizations of new county units, secure the initial appropriation for these units, and assist in the selection of health officer, public health nurses, and other assistants. He may visit the county at frequent intervals, inspect the work and records of the unit, and give advice and counsel to the county health officer. To organize three or four new county units each year, providing suitable personnel, and at the same time to keep in touch with the older units is a large undertaking.

Specialists in the state health department may be called upon, however, for aid in selecting personnel and outlining programs, and for counsel in the event of emergencies and epidemics. The director of county health work will always find available the services of such officials as the directors of public health nursing, laboratory

service, and public health education; the sanitary engineer; the statistician; the chief of the venereal service; the specialists in infant welfare, medical inspection of schools, and prenatal care; the consultant in tuberculosis or mental hygiene, and the epidemiologist.

With the support of a good organization, the program of the county health officer should go forward, month by month, and year by year, until the service of the unit is firmly established as one of the accepted and indispensable functions of government.

City and County Health Administration

Many health authorities are of the opinion that a city and the county in which it is situated should not be independent in health matters, but should be considered as integral parts of a single administrative unit. Disease epidemics are not halted by the corporate limits of the city. And in such health measures as the provision of pure water and milk supplies action must be carried beyond city boundaries. Disease prevention and the promotion of better health may well be carried out for both city and county by one common organization.

Growth of County Health Work in the United States

At the end of the year 1923 there were 230 counties in twenty-eight states of the United

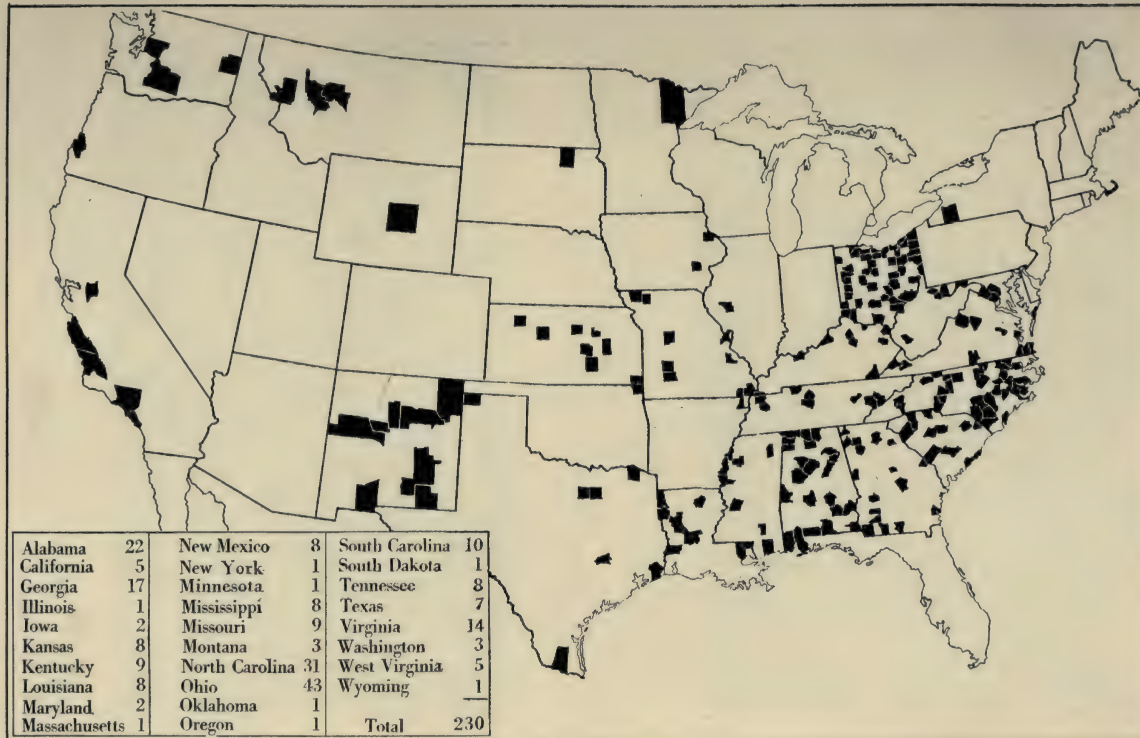
States with full-time health organizations. The number grows each year, and few counties which have given the system a trial fail to continue it and to expand the unit to meet the more obvious needs of the people. In Ohio 48 per cent of the counties now have full-time organizations, in Alabama 32 per cent, in North Carolina 31 per cent, in New Mexico 27 per cent, in South Carolina 21 per cent, in Georgia 11 per cent, and in other states smaller percentages.

Counties having a population of less than twenty thousand can combine into sanitary districts and, at the moderate and reasonable expenditure of fifty cents per capita for the year, can support their own health organizations.

Rural Health in Other Lands

The same tendency toward the development of rural public health work is seen in countries other than the United States, although the number of full-time health officers outside of the cities is still small.

In the province of **New Brunswick, Canada,** a county health system is being established under a co-operative two-year plan. Medical inspection of schools, public health visiting, and laboratory and statistical services have already been reorganized under district medical inspectors.



Alabama	22	New Mexico	8	South Carolina	10
California	5	New York	1	South Dakota	1
Georgia	17	Minnesota	1	Tennessee	8
Illinois	1	Mississippi	8	Texas	7
Iowa	2	Missouri	9	Virginia	14
Kansas	8	Montana	3	Washington	3
Kentucky	9	North Carolina	31	West Virginia	5
Louisiana	8	Ohio	43	Wyoming	1
Maryland	2	Oklahoma	1		
Massachusetts	1	Oregon	1	Total	230

Fig. 11.—County health departments at the close of 1923

Fig. 12.—Mother and five children in Brazil, all suffering from trachoma. This is one of the diseases that will be attacked by the county health departments which are being organized in Brazil as a result of the hookworm campaigns

Fig. 13.—Group of rural school children in Alabama gathered to take hookworm treatment

In **Brazil** organization of rural health work followed closely in the wake of the hookworm campaigns as a natural outgrowth. Only two years have elapsed since the first full-time unit was started, but the idea has already found favor, and county health organizations are being established in several states. In the state of São Paulo the first county health department was organized in 1922, and three more have since been added. Five county health departments were in operation in the state of Minas Geraes by the end of 1923.

The Federal Government is actively interested; the rural health program was given a prominent part in the last annual message of the President of the Republic and in the message of the President of the progressive state of Minas Geraes. The Federal District has a health organization, able to care for the rural as well as the urban region. Federal co-operation in rural sanitation has already extended to sixteen of the twenty states, and at the present time 225 projects are under way. The budgets for 1923 approximate 8:500:000$000, which at normal rate of exchange would be equivalent to about two million dollars.

In Brazil, in addition to the commoner diseases, some provision has to be made for the treatment of tropical maladies such as leprosy,

leishmaniasis, and Chagas' disease. Because of the dearth of physicians in the rural areas, curative medicine cannot yet be separated from preventive, and the dispensary will be an important factor in public health work for an indefinite period.

A national public health association was organized during the year under the name of the Brazilian Society of Hygiene, and the first meeting was held in October; the organization promises to play an important part in the development of sound public opinion on health matters.

In **Czechoslovakia** the first county health program was started at Kvasice, Moravia, in 1922, and its success led to the inauguration of a second in Kladno, a coal mining center surrounded by rural districts having a population of 81,000. Because of their proximity to Prague, Kladno and the adjacent rural communities are being considered as a teaching center or field laboratory for the School of Hygiene at Prague.

III

Hookworm Disease

Further progress has been made during the year in our knowledge of hookworm disease. In Porto Rico an intensive study of a small community of 2,000 persons has shown some of the

difficulties of complete eradication. For medical or other reasons it is never possible to treat every individual, and the untreated and the newcomers in a district, with their high rates of infestation, keep up the disease. It is evident that special attention must be paid to these two groups in conducting follow-up campaigns. Hookworm disease has always been severe in Porto Rico. Worm counts made in the district jail at Arecibo showed that agricultural laborers harbored an average of 572 worms, whereas town dwellers had only 210. For comparison it may be stated that the agricultural laborer in Brazil has an average of 230 worms. In both countries it has been shown that occupation and habit as to shoe-wearing greatly influence the severity of the infestation, the farmer and those who habitually go barefooted showing always the highest rate.

In Porto Rico *A. duodenale* in small numbers, an average of four per person, was found in 25 per cent of the seventy-six prisoners examined.

In the Southern States studies are in progress with reference to the effect of different types of soil on the development of the larvae, the influence of the milder types of the disease on the mental and physical development of school children, and the nature of the apparent relative immunity of the negro.

An extensive series of investigations into the epidemiology of hookworm disease is being carried on in China. The studies show that the disease is sharply localized and that it is important only in certain places and where certain kinds of agriculture are customary, such as cultivation of the mulberry.

Since the introduction of Stoll's simple technique for egg counts, hookworm surveys have increased greatly in value, because the amount of infestation as well as its presence can be determined. In the past, resurveys have failed to show the full accomplishment of the original campaign because of the absence of quantitative information. This need no longer be true.

Control Operations in South America

The demonstration hookworm campaign in **Brazil** which began seven years ago, has now been virtually completed. Except for five posts in São Paulo, the work has been transferred to the states and counties. Government campaigns are under way in all but two of the twenty states of the Republic.

In **Dutch Guiana** work has been carried on with but one interruption since the campaign opened in 1915. In 1918, owing to war conditions, activities were suspended, but they were resumed in 1921 and concluded in October, 1923,

when, in accordance with the original plan of co-operation with the Surinam Government, the Board's support was withdrawn.

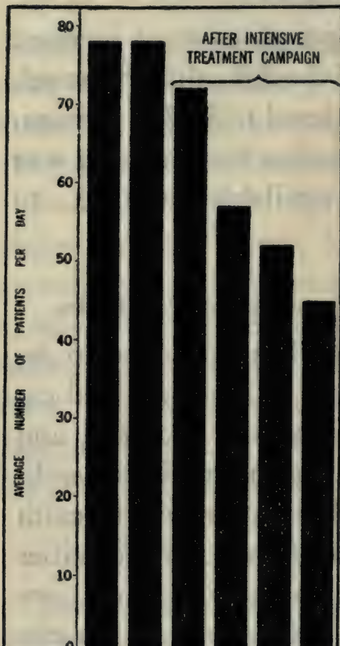
In **Colombia** control operations went forward during the year in spite of the difficulties of travel. Treatments were administered to 84,200 persons. The government appropriation for the work was increased from $50,000 available in 1923, to $60,000 for 1924.

Increased Government Support in the West Indies

In **Jamaica** Government has continued to develop its health service and to maintain and extend control of rural sanitation. Colonial and parochial boards are increasing their expenditures in an effort to develop a permanent health organization. Results of educational activities have been far-reaching; sanitary latrines are being installed in rural homes entirely on the initiative of householders in districts not likely to be reached directly by hookworm campaigns. In one district the main highway passes for more than fifty miles through a thickly settled area in which every home has a satisfactory latrine.

The campaign in Jamaica has again demonstrated that hookworm control measures, properly instituted and maintained, are followed by reduction in general morbidity, especially in

such diseases as typhoid and dysentery. Hospital records show that the average daily number of patients treated at Lionel Town Hospital, after the campaign in 1919, decreased from seventy-two in 1920 to forty-five for the first nine months of 1923. Typhoid admissions to Spanish Town Hospital following the campaign of 1920 were reduced from seventy-three in that year to six in 1923 up to the end of November. The number of dysentery patients in the same institution fell from thirty in 1920 to one in 1923.



PATIENTS	78	78	72	57	52	45
YEAR	1918	1919	1920	1921	1922	1923

Fig. 14.—Reduction in the average daily number of patients treated in the Lionel Town Hospital, Jamaica. The figures show that the intensive hookworm campaign diminished the amount of sickness from all diseases and especially from typhoid and dysentery

Since the inauguration of the hookworm campaign in **Porto Rico** in 1921, activities have been confined to the northwestern part of the island. Two units are in operation under a five-year agreement, one for

the period 1921 to 1925, the other for the period 1923 to 1927; in addition, two treatment units are supported entirely by Government. The yearly government appropriation for hookworm control has increased from $30,000 in 1922 to $60,000 in 1923, exclusive of administration and other overhead expenses of the Department of Health. The total appropriation of the Insular Department of Health for 1923 was greater than for any previous year, amounting to over $1,300,000, and representing more than one tenth of the total insular budget. During 1923 a reorganization of the Department of Health was effected and a Bureau of Uncinariasis created to direct rural sanitation and hookworm operations.

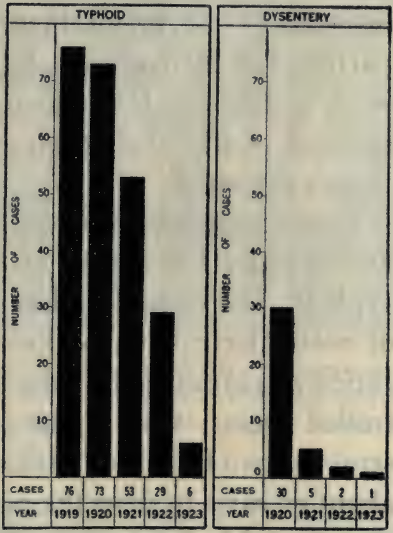


Fig. 15.—Reduction in the number of admissions to the Spanish Town Hospital, Jamaica, for typhoid and dysentery, following a sanitary campaign conducted during the latter part of 1920

In **Trinidad** intensive campaigns were carried out in St. Andrew and Nariva counties, and a

general public health program for the colony was further developed. The government appropriated £30,920 for sanitation and drainage during the year, and a force of nineteen sanitary inspectors was maintained. The medical department is instituting a full program of health work in two special areas including medical inspection of school children and the usual county health activities.

Special emphasis has been placed on education, and popular knowledge of hookworm, malaria, typhoid, and dysentery has increased. A series of weekly lectures on hookworm disease and sanitation was arranged for school teachers in the controlled areas. One of the district officials constructed two full-sized latrines, which were taken about on carts to show the people of certain areas the type of building that should be installed.

In response to government request, arrangements have been concluded for infection surveys in the **Leeward Islands, Dominica, St. Kitts, Montserrat,** and **Nevis.** At the invitation of the President of **Haiti,** conveyed through the United States High Commissioner, plans have been perfected for a sanitary survey during 1924.

Progress in Central America

The Government of **Panama** has raised its biennial appropriation for hookworm control

Fig. 16.—A group assembled for hookworm treatment in a village in Madras, India. Note the tom-tom beater who calls the crowd together. The second man from the left is the headman of the village

Fig. 17.—A group of prisoners in Mauritius. These prisoners are examined for hookworm disease, treated, and cured. They are then taught how to avoid reinfection, so that when they return to their homes in various parts of the island they may become useful propagandists for better sanitation

Fig. 18.—*Upper left:* An influential Hindu citizen in the North Arcot District, India. This man was the first person in his village to construct a latrine as a result of the hookworm campaign. He and his family were also the first to take the hookworm treatment. *Upper right:* Taking hookworm treatment in New Guinea. *Bottom:* Administering hookworm treatment in Madras, India

from $25,000 to $35,000, and progress has been made on plans for a national department of health on broader and more permanent lines. Efforts to improve the public health education of the people are meeting with success. Measures for hookworm control have been carried out in many provinces, and definite progress in latrine construction is apparent.

During 1923 the legislature of **Costa Rica** enacted a new sanitary code and completed plans for the establishment of a department of vital statistics and a diagnostic laboratory.

A visit to the work in **Nicaragua** showed that the hookworm and malaria demonstrations have been accepted and are firmly established. Government is making progress in enlarging its Board of Health and in establishing an effective organization which will gradually absorb the hookworm work, public health laboratory, malaria operations, and other activities in which the Board has participated.

In **Honduras** the work has continued and broadened in scope. Hookworm control was carried out according to the usual plan; a public health laboratory was established; and tentative plans for a permanent health organization were formulated. Government contribution to the work, in the light of its resources, has been liberal.

In **Salvador** the enlarged national health

organization is now in charge of all hookworm work as well as other health activities. Public health education, vital statistics, laboratory diagnosis, and examination of foods and drugs are better cared for than at any time in the past. Improvements in the water supply of San Salvador, the capital, are under way, and several malaria projects are being matured.

In **Guatemala** the rather long preliminary period of demonstration seems to be closing, and plans have been made for more effective organization, in which Government will participate to a greater extent each year.

Co-operative Work in the Far East

During the year resurveys of the schools, coal mines, and aborigines' settlements in **Australia** showed a decrease of infestation except among the aborigines. The prospects for reducing soil pollution are excellent, and hookworm disease can be controlled as a result of the educational campaigns now under way.

In **Siam** the hookworm campaign was transferred during the year to a new division of the national health service, created for the purpose. A most successful educational campaign was carried out; an exhibition of public health activities held in Bangkok was visited by appreciative thousands during the week of its duration.

With the improvement in medical education now under way, a more nearly adequate supply of health officials should be available in the future.

Mass treatment, with carbon tetrachloride alone or combined with oil of chenopodium, has nowhere been used so extensively as in **Fiji.** Practically the entire native population has been reached during the past two years—an achievement which would have been impossible with any other system. The resulting improvement in the general health of the people is already apparent to the discerning layman. The problem of soil pollution is being slowly solved by the installation of sanitary latrines. The work is being gradually transferred to Government, and it is expected that early in 1924 the Board will be able to withdraw its representative. Health surveys are now being made in nearby islands of the South Pacific.

In **Ceylon** work in the villages has been continued with some attention to large estates and plantations. It is in such countries, where progress in sanitation is naturally slow, that mass treatment of the heavily infected population is especially serviceable. A feature of the work has been the standardization of hookworm treatment in the many hospitals and dispensaries; during the year 500,000 out-patients were treated at 240 institutions with resulting simplification

of the hospital program. A rough estimate of expenditures for hookworm work on the estates during 1923 is 15 million rupees. A good beginning has been made in public health in that the emphasis is shifting from curative to preventive medicine.

In the **Madras Presidency, India,** the hookworm problem is staggering in size; many mil-

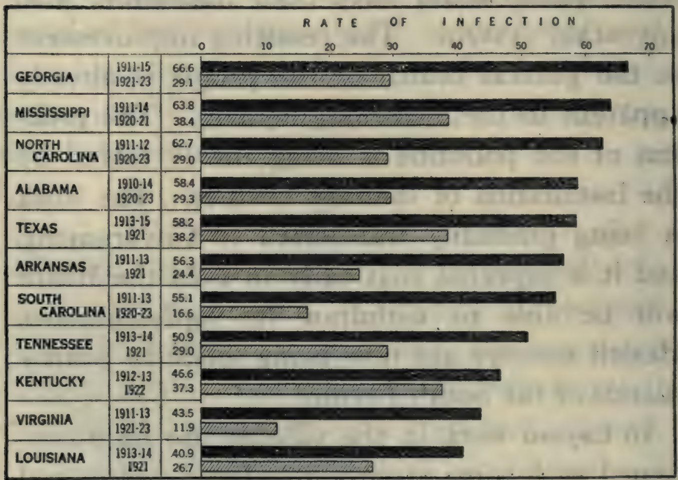


Fig. 19.—Average rates of infection among school children in Southern States at time of original hookworm surveys, compared with the present rates as shown by resurveys conducted in 1920, 1921, and 1923

lions are infected in this one province, and progress in control has been slow. An attempt is being made here as in Ceylon to establish the custom of treating for hookworm disease the multitudes who apply for medical relief of various kinds at the hospitals and dispensaries of the

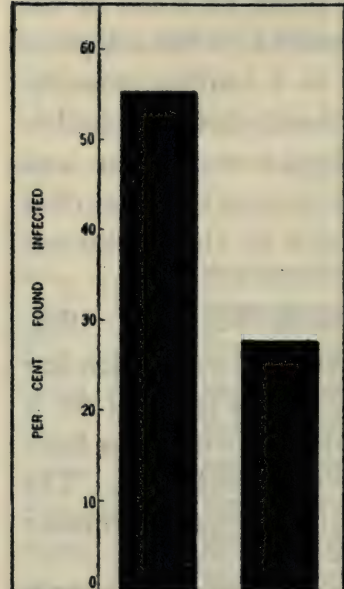
province; some advance has been made, although the funds so far available for the purpose are insufficient. Demonstrations in the control of disease which have been given on some of the large plantations have resulted in the adoption of hookworm treatments as a routine measure. Pupils of a large number of schools were found to be heavily infected with hookworm disease, and their improved condition following treatment has created a favorable reaction to the hookworm work.

In **Mauritius**, where work began in 1922, some progress has been made; presanitation has been started in one area, and is planned for a second; control and educational campaigns have been carried out in the sanitated area. The local press has been helpful, and the government has enacted good sanitary laws.

Resurveys in the United States

During the years 1910 to 1915, hookworm campaigns were conducted in eleven southern states—Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Arkansas, Tennessee, Kentucky. Special investigation was made of the infection rate among rural school children between the ages of 6 and 18 years, as it was early recognized that in this age group the severest infections occur.

Specific figures were obtained for this group in 422 counties. Infection rates in the original surveys were based on the findings of microscopical examinations, by the plain smear method, of fecal specimens from a minimum of 200 rural school children in each county.



PER CENT INFECTED	55.1	27.8
PERSONS EXAMINED	89,857	44,090
PERSONS INFECTED	49,471	12,236
YEAR	1910-1915	1920-1923

Fig. 20.—Reduction in rate of hookworm infection among school children in eighty-one counties in the Southern States from time of original surveys to the resurveys made in 1920–1923

During the years 1920 to 1923, 81 of the 422 counties were resurveyed. In the original surveys of these counties, 89,857 rural school children were examined, of whom 49,471 were infected, giving a rate of 55.1 per cent. In the 1920–1923 surveys 44,090 children were examined, of whom 12,236 were infected, giving a rate of 27.8 per cent, a reduction since 1910–1915 of 49.5 per cent.

Of the 81 counties above mentioned, 16 in five states—Virginia, North Carolina, South

Carolina, Georgia, and Alabama—were resurveyed during 1923. In the original survey of these 16 counties 3,748 children, of 6,331 examined, were infected, giving a rate of 59.2 per cent. In the 1923 surveys 2,058 were positive out of 8,598 examined, giving a rate of 23.9 per cent, or a reduction since the original surveys of 59.6 per cent.

The same microscopical technique was used in the resurveys as in the original surveys, and the rates for each county were based on the examination of a minimum of 500 rural school children, 6 to 18 years old.

The reduction in rates may be attributed to several factors: (1) Repeated treatments by the original campaign dispensaries and by physicians, (2) general impetus given to sanitation in the original campaign through educational work, (3) service rendered in recent years by physicians, health officers, nurses, and inspectors.

IV

Victories over Yellow Fever

Yellow fever was eradicated from Guayaquil in 1919 and from Peru in 1921. No cases are known to have appeared in Nicaragua or Guatemala since 1921. A few cases were reported from British Honduras in 1921, but the epidemic was rapidly and easily controlled. In Mexico, con-

trol operations were formally closed in November, 1923. No cases have been reported there since December, 1922, and the health authorities of the republic have announced that the disease has been stamped out. The disease has now been eliminated from the west coast of South America, from the republics of Central America, and from Mexico, and is no longer present anywhere on the North American continent. On the southern continent there are but two known foci—one in Colombia, the other in northern Brazil—and active work is in progress in both.

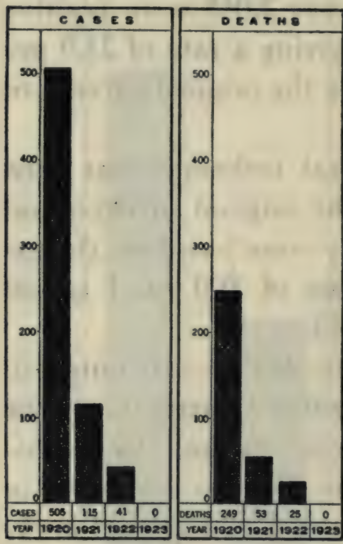


Fig. 21.—Yellow fever in Mexico

Early in 1923 several hundred cases were reported at Bucaramanga, the capital of the state of Santander in Colombia. On invitation from the Colombian Government, experts were sent by the Board, the diagnosis of yellow fever was confirmed, and control measures were instituted. The Stegomyia index was rapidly reduced, and new cases ceased to appear; none

Fig. 22.—Yellow fever in retreat. Map of western hemisphere showing steady reduction of infected areas

have been reported since May, 1923. There is every reason to believe that the disease is under control. The survey of adjoining regions has been carefully and completely carried out, and no new foci have been discovered.

Reducing the Yellow Fever Zone in Brazil

In Brazil a narrow yellow fever zone about 4,500 miles in length extended in 1900 from below Rio de Janeiro to Pará and from the mouth of

the Amazon river up to Iquitos; this was cut down, by the work of Oswaldo Cruz and his colleagues in Santos and Rio de Janeiro, and of Wolferstan Thomas, Converse, and Brazilian authorities in the Amazon valley, to a coastal strip of approximately 1,500 miles extending from Bahia to Pará. This strip includes the extreme points at which the presence of yellow fever has been suspected during the last decade. A serious epidemic occurred in Ceara from 1921 to 1923, among both foreigners and Brazilians. Occasional cases have been reported from Recife, the capital of the state of Pernambuco. In Bahia the disease has been endemic, and during 1923, a total of 157 cases were reported with thirty-nine deaths.

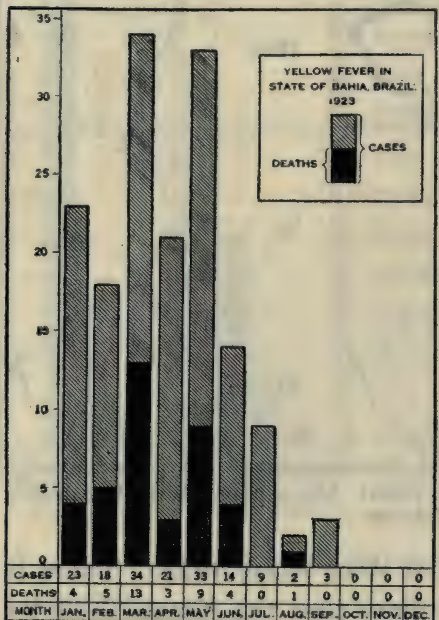
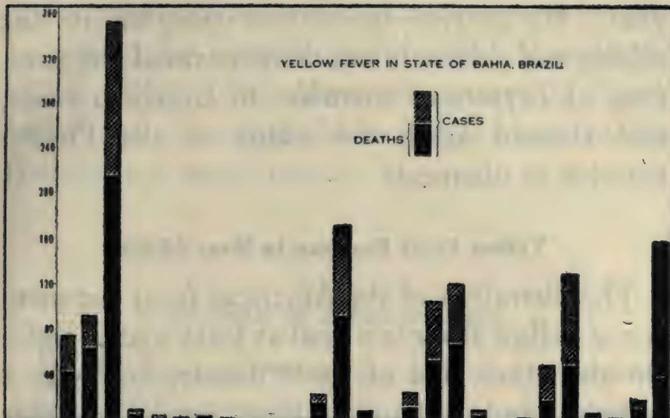


Fig. 23.—Yellow fever in the state of Bahia, Brazil. Cases and deaths reported during 1923



YEAR	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
CASES	75	93	351	10	4	3	3		0	0	0	23	172	8	0	25	105	120	9	0	1	49	129	7	2	19	157
DEATHS	44	65	216	6	3	1	0	0	0	0	0	16	93	8	0	13	54	68	5	0	1	18	48	1	2	11	[illegible]

Fig. 24.—Yellow fever in the state of Bahia, Brazil. Cases and deaths from 1897 to 1923

In May, 1923, the Federal government of Brazil invited the Board's co-operation in connection with the yellow fever program. A survey was undertaken as a result of which a campaign was launched by the Brazilian department of health. Mosquito control measures were organized in the suspected area; posts were established in nine ports, with the idea of reducing the Stegomyia index of these cities to the safety limit and so cutting off the infection from the interior and smaller towns. In Bahia, which seems to have been the principal endemic focus, no new cases have been reported since September, 1923.

A feature of the Brazilian campaign has been the presence of Dr. Noguchi during part of the

year. He carried on further research in the etiology of yellow fever, demonstrated the presence of *Leptospira icteroides* in Brazilian cases, and showed again the value of the Pfeiffer reaction in diagnosis.

Yellow Fever Problem in West Africa

The liberation of the Americas from the menace of yellow fever is a goal at least within sight. On the other side of the Atlantic, however, a complex and serious problem invites another campaign: the west coast of Africa from Senegal to Angola is under suspicion. A commission sent to this region by the Board in 1920 saw no yellow fever, but found strong indication that the infection had been present within recent years. Government reports from the Gold Coast for the period from November 5, 1922, through July 6, 1923, record 26 cases of yellow fever with 21 deaths. The Board has been invited to send a commission to report the feasibility of control measures, and it is planned to carry out this project as soon as the personnel is available.

The possibility of the introduction of yellow fever into the Orient, with its abundance of Stegomyia, its tropical climate and primitive sanitation, and its millions of non-immunes, has been discussed by Sir Patrick Manson and many others. In India and other places in the Orient

quarantine officers are making preparations so as not to be overwhelmed should the disease travel so far. Each focus eliminated in North and South America and in West Africa makes that danger more remote.

V

Growth of State Services

In the **United States** the Board co-operated during 1923 in health work of some character in 31 states: in county health work in 22 states; in county-wide malaria control in 8; in town malaria control in 5; in laboratory service in 7; in sanitary engineering in 3; in vital statistics in 1; in epidemiology in 2; in public health education in 1; in a fellowship program in 12. In addition, field studies in malaria control were conducted in 2 states and investigations in hookworm disease in one state. Aid was given to 8 states in developing 20 whole-time county organizations to feature malaria control. Co-operative programs were entered upon during the year in 4 states—Iowa, Montana, Minnesota, and Wyoming. In 3 of these whole-time county units were organized.

In **Australia** the co-operative program is now drawing to a close, and the Board's participation will cease in 1924. The health activities of the

commonwealth are increasing in scope. New departments of sanitary engineering and industrial hygiene have been established.

In the **Philippine Islands** the health service has been reorganized in accordance with a law passed at the last session of the legislature, and provision has been made for better control of serums and vaccines used in the islands. An investigation into the prevalence of typhoid fever in Manila was completed and several campaigns against hookworm disease were inaugurated.

In **Czechoslovakia** there have been significant activities in many fields of public health. A study of the venereal disease situation stimulated larger appropriations for work in this field. A survey was made of the milk supplies of Prague and Brno, and for the first time complete information was collected on the subject. Promising work was carried on in popular health education: five traveling health exhibits on different subjects were circulated; successful work was done among children by means of health plays, health rhymes, and other devices. A new building code was prepared by the Ministry of Public Works, including considerations of town planning and housing inspection. A study was made of population and depopulation, and another of the care of old people and incurables throughout the republic. Nutritional studies

were carried on, the first group investigated being students of the Czech University of Prague. Information was collected with regard to all water supplies and sewage disposal plants throughout the country. A rural hygiene demonstration was conducted in Kvasice and a new demonstration was started in the Kladno district. In addition to these activities the International Classification of the Causes of Death was translated and special attention given to the question of revision of the federal law regarding vital statistics.

VI

Co-operation with the League of Nations

Co-operation begun last year with the Health Committee of the League of Nations has been continued. The three-year provision by the Board for interchange of public health personnel made it possible for the Health Committee to arrange a visit to England and Austria during the early months of 1923 for twenty-nine officers from sixteen countries. The third interchange (the second during the year) was held in the United States and was participated in by twenty-five officials from eighteen countries. In addition to these rather formal programs a small group of malariologists visited Italy during May and June, and individual laboratory specialists

studied in Holland and at the Institute of Tropical Medicine in London. Plans have been made for four interchanges during 1924, to be held in Great Britain, Holland and Denmark, Switzerland, and the Far East. In addition special programs have been prepared for interchanges of experts in tuberculosis and in school hygiene.

The first full year's work of the new Division of Epidemiological Intelligence of the Secretariat of the Health Committee has been successfully completed. The Division publishes a monthly bulletin which includes authoritative data from more than seventy countries in Europe, Asia, Africa, America, and Australasia. In the course of the development of this work it early became evident that the standards used in different countries in the compilation of their vital statistics vary widely. In order to harmonize the work, a grant was made by the Board to permit conferences of vital statisticians from the participating countries and during the year the first of these conferences was held in Geneva.

VII

Tuberculosis in France—Co-operation with Comité National

With the exception of the Division of Public Health Visiting, which is being directed by a representative of the Board, all activities for the

Fig. 25.—Staff and students, school for training of health visitors, Strasbourg, France. This is one of a number of schools for the training of public health nurses in France to which the International Health Board is giving assistance

Fig. 26.—Nurses' home, Hospital Salpêtrière, Paris

Fig. 27.—Classroom, school for training health visitors, Strasbourg, France

Fig. 28.—Demonstration room of school for training health visitors, Strasbourg, France

prevention of tuberculosis in France that were carried out in co-operation with French authorities have been transferred to French auspices.

The work has been continued in its entirety by the Comité National de Défense contre la Tuberculose. Admirable results have been accomplished in a country-wide campaign of public health education, several departments have voted sums for work in co-operation with the Comité, the Ministry of Hygiene has made a generous appropriation. The Comité through its own organization has raised approximately 270,000 francs from private sources for the work of tuberculosis control.

Public Health Nursing in France

The transfer of the Division for Public Health Visiting, the only part of the tuberculosis work not already in the hands of the French, is under way. At the close of 1923, only 31 per cent of the students in training as health visitors were receiving scholarships from the International Health Board as compared with 45 per cent at the end of 1922. All the training centers have received subventions from the Ministry of Hygiene, and certain committees of the French Department have granted fellowships. The law passed in July, 1922, giving legal recognition to bedside nurses and public health visitors and

standardizing the training schools in France has already shown its effect in accelerating the development of these institutions. Four schools offer training in both bedside and public health nursing. In Nantes separate schools for bedside and public health nursing are co-operating; three schools, two of them on a permanent basis, train health visitors exclusively. In September, 1923, a school for nurse training, including public health nursing and child welfare work, was inaugurated in Lyons as a result of the amalgamation of public health teaching centers with La Charité hospital. The Board aided this enterprise by a subvention of 100,000 francs. It also contributes to the Secrétan Tuberculosis Dispensary in Paris. One nurse has been sent to the University of Toronto for the study of public health nursing.

VIII

Public Health Nursing

Nurse Training in the Philippine Islands

The first course in public health nursing to be given in the Philippine Islands was inaugurated on August 1, 1922, and six months later thirty students were graduated. A second class of sixty-nine nurses completed a similar course in December, 1923. The University of the Philippines will continue the instruction. Four Fili-

Fig. 29.—Map showing lack of trained personnel for spreading public health education in the Philippine Islands. The provincial or district nurse, of the type which the International Health Board is aiding the Philippine Health Service to train, spends most of her time in visiting the houses of the poorer classes, giving the necessary nursing care and teaching hygiene and sanitation

Fig. 30.—At the opening of the Baguio training school for Igorot nurses, Philippine Islands. The so-called mountain provinces in the Island of Luzon, north of Manila, have been practically without a nursing service. To meet this need a training school has now been organized at the Baguio Hospital. The International Health Board has lent to the Philippine Government the services of a consultant to assist in the organization of courses in public health nursing

Fig. 31.—The first student nurses in the Baguio school for nurses, Philippine Islands

pino nurses have been granted fellowships for study in the United States in administration, teaching, and public health. A modern curriculum for training schools has been prepared. A training school was opened in April, 1923, at Baguio for the Igorot region, and Government has provided scholarships for preliminary education of Moro girls and boys who may wish to enter the training school at Zamboanga.

Development of Nursing Service in Brazil

In Brazil the Board is co-operating with Government in the development of a nursing service. The National Congress appropriated approximately $123,000 during 1923, and has approved a larger budget for 1924. The outstanding feature of the past year was the opening of the school of nursing on February nineteenth in the 300-bed government hospital of São Francisco de Assis. The school with a graduate nurse staff of seven American and English nurses and a paid teaching staff of Brazilian doctors offers a course of two years and four months leading to a nurse's diploma. The first two years are devoted to general training, and the last four months to training in an elective speciality, such as public health nursing, hospital administration, dispensary service, or other special work. In view of the fact that there are as yet no trained public

health nurses available, a ten months' emergency course for health visitors is being offered. Practical instruction is given in the neighborhood of the hospital. Nineteen students were graduated as health visitors in December, making a total of fifty since the beginning of the work. At the end of the year there remained fifteen students in the emergency course and nineteen in the school of nursing. These visitors are employed in Rio de Janeiro in the Bureaus of Venereal Disease, Tuberculosis, and Child Hygiene and are supervised by the Service of Nursing.

The medical profession and the public are increasingly sympathetic with the ideals of nursing. At the close of the Brazilian Centennial Exposition the exhibit prepared by the Service of Nursing was sent to the Pasteur Centennial Exposition. A pageant of the History of Nursing given in co-operation with the Girl Guides aroused great interest. The Brazilian Congress of Hygiene devoted an entire evening session to a discussion of the nursing program. One Brazilian nurse is studying public health nursing in the United States on a fellowship from the Board.

IX

Public Health Laboratories

The experience of the past year has shown the great value of branch state laboratories, even in

Fig. 32.—Students of the school of nursing of the National Health Department of Brazil

Fig. 33.—Pageant of the history of nursing

A pageant depicting the history of nursing proved to be an effective means of securing publicity for the new school of nursing organized by the National Department of Health of Brazil with the aid of the International Health Board. Costumes in this picture represent types of nursing service and prominent characters in the history of nursing: from left to right, Clara Barton, Jane Delano, Frederica Fleidner (above), the nurse on private duty, Linda Rickards (above), Florence Nightingale (center), Sairey Gamp, hospital nurse, nurse in military service, Edith Cavell, and public health nurse

Fig. 34.—Students and nurses in the Florence Nightingale school for nurse training, Bordeaux, France

Fig. 35.—Public health education in Siam. In a drive for new members the Siamese Red Cross Society held a parade, viewed by enormous crowds, which was featured by many floats and exhibits emphasizing various problems of public health. One automobile bearing a huge globe in imitation of the seal of the Rockefeller Foundation appears in the foreground

regions where the headquarters laboratory has not reached its full development. The opening of branches results in a rapid increase in amount of work performed and number of physicians served. No other activity of the health department so quickly produces an improvement in medical practice as the diagnostic laboratory, or brings to its support so many of the medical profession. In the United States the Board has assisted during 1923 in developing nine laboratories in seven states.

In **Honduras** a diagnostic laboratory was opened in November. **Costa Rica** is ready to establish a laboratory and to make substantial contributions for its support. In **Nicaragua** a laboratory has been conducted by a native staff throughout the year, and two branches have been opened so that diagnostic service is now available for the greater part of the country. In **Salvador** excellent work has been done, and the field of activity of the laboratory has been extended to include the examination of foods and drugs. In **Guatemala** the amount of laboratory work is gradually increasing.

Manila has long had the distinction of having one of the earliest and best equipped diagnostic laboratories anywhere in the world. The work is now being expanded, brought up to date, and popularized among the medical profession.

X

Malaria

United States

The present general campaign against malaria in the Southern States of the United States may be said to have started in 1917, in and about the many army camps scattered from Maryland to Texas. Naturally the work inside the camps was done by the army, and that in the environs by the United States Public Health Service, which enlisted, so far as possible, the assistance of the state and the local communities. With the close of the war this particular effort stopped. As a war measure it had been carried out regardless of expense; the cost was invariably high, and sometimes where the camps, for strategic reasons, were located in regions where the control problem was especially difficult, it was very high. The hesitation of smaller and poorer communities to undertake the work was easily understood.

Previous reports have told of the pioneer work of the International Health Board in malaria control, beginning in 1916. By a series of demonstrations, it was able to show that malaria control need not be expensive, but that an average community can virtually rid itself of the infection at a per capita cost of from $0.45 to $1 a year, provided a careful preliminary

survey is made to define the particular local problem. When adequate control measures have once been established they can be maintained from year to year at a much lower per capita cost. The results of the demonstrations were brought to the attention of state health authorities, and an ever-increasing number of projects have been undertaken by the community or county, the state, the United States Public Health Service, and the International Health Board.

For malaria prevention, as for public health work in general, the county is a better administrative unit than the town, since county organization makes for greater stability and continuity of effort. During the past year the Board's work has been carried out on a county basis. Wherever possible the control campaign is directed by the county health officer, with the advice and assistance of the state health officer and his staff. During the year, seventeen new counties undertook antimalaria campaigns in addition to those previously organized.

Spot maps of the counties show that the disease is not uniformly distributed but is usually limited to a relatively small number of definite foci. A study of each of these reveals the source of the trouble; more often it proves to be some man-made collection of water—a fish pond, a

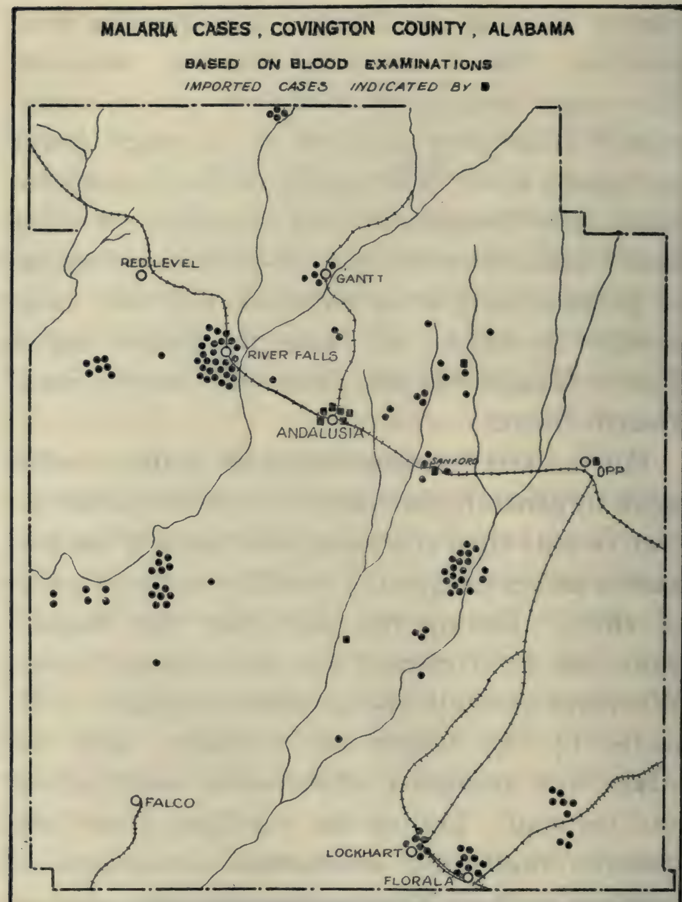


Fig. 36.—Cases of malaria disclosed by a preliminary survey of a typical rural county. The map shows a usual condition—a limited number of foci of infection irregularly distributed

millpond, a hydro-electric project, or merely the damming of natural drainage channels by railroads or highways. Breeding in such collections

of water is often easily controlled by drainage or other measures, such as, the introduction of top-minnows, oiling or the application of larvicides, clearing the shores of reservoirs, or training streams. In fact, in many places where the natural drainage is fairly good the farmer can protect his household and improve his crops by the usual agricultural ditching. Unfortunately it is not always so easy; in the delta region of the Mississippi even minor drainage is difficult or impossible at present, and in the limestone region of south Georgia, where the land is dotted with chains of lime-sinks, no practicable drainage plan has yet been found. The obvious course in such regions is to drain as much as possible, eliminate all man-made breeding places, and fall back upon screening and the use of quinine while continuing investigations for a better plan.

In the United States all classes of the population have been in the habit of using quinine more or less; frequently it is in the form of chill tonics, which are weak and expensive mixtures of quinine. An important step has been the increasing use made of the standard quinine treatment of Bass, endorsed by the National Malaria Committee and the United States Public Health Service. This treatment calls for the administration of ten grains of quinine a day for a period of eight weeks. For a small amount of money

enough pure quinine for two months' treatment is obtained in a single package.

In making a survey it is necessary to have some reliable measure of the amount of malaria existing. The experience of the past year has shown that in the United States, as well as in the tropics, the splenic index of children is probably the simplest and best although no single index is of value in all localities. Blood indices, clinical histories, and physicians' morbidity and mortality reports are all needed.

Of the malaria-carrying mosquito much remains to be learned. Studies are under way to show the factors influencing the choice of breeding places by *A. quadrimaculatus*, *A. crucians*, and *A. punctipennis* at different seasons of the year; to show how often each is found infected in nature, (all these species can be infected in the laboratory); to show the possible influence of animal barriers; and to determine the preference, if any, for man or the domestic animals. With more complete knowledge of the life history of these mosquitoes, further simplification of control measures may be possible.

Malaria Studies in Tropical Areas

Field studies in Nicaragua, now nearing completion, have demonstrated that, under tropical conditions in areas such as Rivas, malaria can

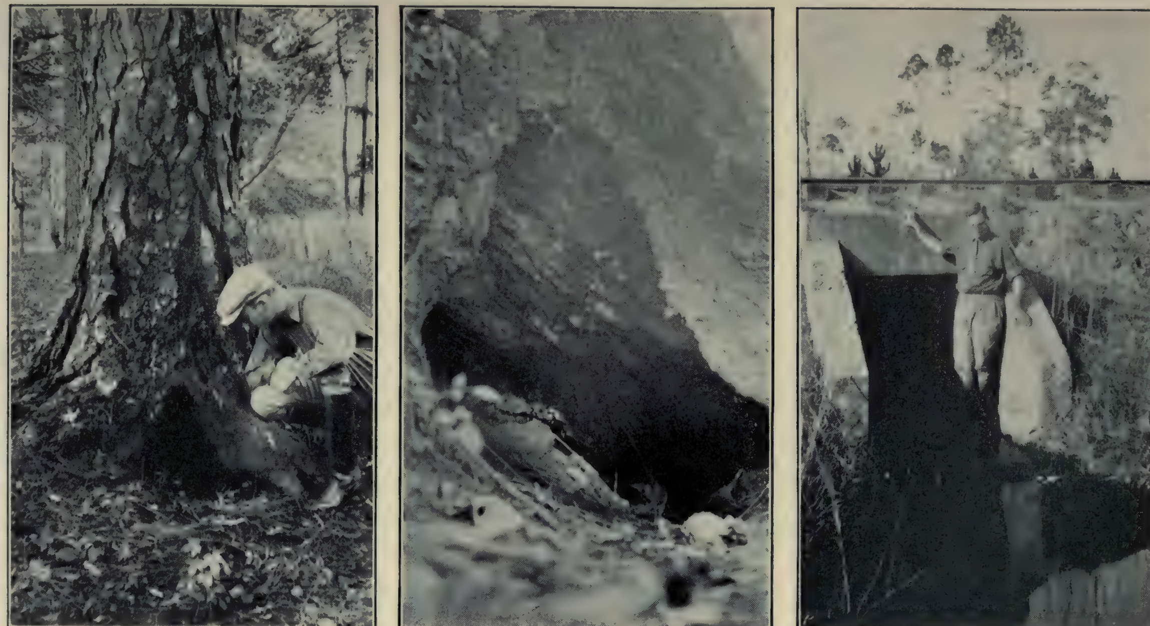


Fig. 37.—*a*. A tree hole shelter for *Anopheles quadrimaculatus; b*. a close-up view of same hole, showing numerous mosquitoes resting; *c*. railway culvert: a favorite resting place of *A. crucians*, which breeds in the water in the foreground

Fig. 38.—Highway bridge in Georgia, a typical shelter for *Anopheles punctipennis* throughout the year, and at times for *Anopheles quadrimaculatus* and *Anopheles crucians*. *A. punctipennis* breeds in the streams, which had been dried up by the autumn drought when the picture was taken

Fig. 39.—A typical negro dwelling in southern Georgia. Frequent inspections showed *Anopheles quadrimaculatus* inside the house and all three species of anophelines underneath

be controlled by means of minor drainage without the use of oil or larvicides but with the use of larvicidal fish, and that control measures, once inaugurated, can be maintained at an annual cost of approximately 13 cents per capita.

The advisability of antimalaria work is illustrated by the fact that in one small area of Nicaragua where control measures were carried out the number of hours lost by cable company employees through illness was reduced from 1,246 in 1920 to 125 in 1922.

In **Palestine** the survey begun in 1922 has been continued. It is apparent that malaria control in many of the villages surveyed is possible at a reasonable cost. Neglected irrigation ditches have been a prolific cause of trouble; these can be repaired, as a rule, at small cost with less malaria and better crops as a result.

In the **Philippine Islands** studies of the prevalence and intensity of malaria are being continued and the problem is already more clearly defined. Control measures, such as the use of suitable fish, screening, and drainage are being studied. It is apparent that minor drainage has not been used as much as it might be, and that it is the most promising single measure in view.

A fairly complete picture of the disease in the vicinity of Rio de Janeiro, **Brazil,** has been

secured; experimental control demonstrations have been undertaken by two units working in four selected areas in the state of Rio de Janeiro. The investigations have already yielded a discovery of fundamental importance by establishing *Cellia argyritarsis* as the principal vector of malaria, although *Cellia tarsimaculata* was proved to be an important carrier.

In the areas studied it seems probable that the disease can be controlled by minor and inexpensive drainage.

XI

Public Health Education

The demand for trained health officers is much greater than the supply, and it is this condition which constitutes the greatest present handicap to rapid progress in public health administration. Schools of hygiene and public health are graduating an increasing number of men, but the supply is quite inadequate. Public health as a career for physicians is a relatively new idea, and time must pass before it permeates the medical profession. Not that educators are unaware of the needs; they are informed and are making progress in training physicians as to the importance of public health, but it remains true that most graduates of medical schools desire to

practice medicine and that only a few are likely to hear the call to public service.

The day is past when any physician qualified for practice can act as health officer, giving only part of his time to official duties. Medical training needs to be supplemented by special instruction in the theoretical and practical aspects of public health administration. In many foreign countries, it has long been the custom for the universities to offer courses in public health, leading to a special diploma, and custom, and sometimes the law, have decreed that only those holding such diplomas or certificates are qualified to hold positions as health officers. Our schools do not as yet graduate sufficiently large numbers of physicians with public health training to make that system possible in the United States. The courses given at Harvard and at Johns Hopkins are well attended, and positions are waiting for the graduates. Both schools are supplementing the curriculum by extra-mural training in the field with state, county, and municipal departments of health.

São Paulo

In São Paulo, Brazil, the Institute of Hygiene of the Faculty of Medicine has completed its sixth year. Industrial and school hygiene have been added to its curriculum. A dispensary has

been opened for the treatment of patients harboring parasites and for the administration of biological products, serums, and vaccines; and a public medical library has been established. In addition to the usual undergraduate instruction in medicine, courses were given during 1923 for laboratory assistants, rural county health officers, school teachers, and many persons important in the industries. Four undergraduates have chosen work in hygiene for their theses. Two fellowships granted by the Board have been productive in investigations in school and industrial hygiene. The division of epidemiology continued its inquiries into the typhoid problem in the city of São Paulo; and further study was made of Brazilian food supplies. A conference of all health officials of the state was held at the Institute during the year and provision was made for similar conferences in the future.

Prague

The first four buildings of the Institute of Hygiene in Prague were practically completed during the year; several departments were organized and started work in temporary locations. Personnel and equipment are being selected so that there will be no unnecessary delay in inaugurating both technical and teaching activities.

Warsaw

In Warsaw, Poland, the new building for the school of hygiene is more than half completed. Work has already been started in the adjoining state epidemiological institute. A division of biological chemistry was organized during the year.

The training of health officers by means of fellowships has been continued; courses for subordinate sanitary personnel have been inaugurated in Warsaw. Field training will be given in the nearby town and rural district of Skierniewice.

London

Dr. Andrew Balfour has been selected by the transitional executive committee as director of the London School of Hygiene and Tropical Medicine. An application has been made for a charter, which completes the work of the provisional committee, and 1924 promises to see the opening of the school.

XII

Fellowships

The fellowship program of the Board has been continued in an enlarged degree on the same general principles as heretofore. For the year 1923 fellowships were provided for one hundred

thirty men and women from twenty-two countries, as follows:

Australia	4	France	2	Peru	1
Austria	3	Great Britain	1	Philippines	6
Brazil	13	Hungary	7	Poland	11
Canada	7	India	5	Salvador	1
China	2	Java	1	Siam	2
Colombia	1	Mauritius	1	Spain	3
Czechoslovakia	13	Mexico	1	United States	42
		Netherlands	3		

The past year has seen the entry of ex-fellows into important public health positions in many countries. In two countries, men who have studied on fellowships from the Board now hold the position of chief health officer.

Publications

During the year 1923 staff members and others directly associated with projects in which the Board participated made the following contributions to medical and public health literature, most of them in the form of articles published in medical journals that are widely circulated among persons interested in medical and public health topics:

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APPENDIX

I

THE SPLEEN INDEX IN MALARIA

In Lee County, Georgia, where a laboratory has been established for the study of certain field problems in malaria control, investigations were conducted by Dr. Darling during 1923 to determine the reliability of the spleen index as a measure of malaria.[1] Although spleen examination is extensively employed in malaria diagnosis in the Orient it has not yet been generally adopted in the United States, and little has been done to ascertain the limits of its usefulness. It is a method of diagnosis requiring much less time than the taking of clinical histories or the examination of blood specimens. It is of particular value in work among children and among ignorant and dependent peoples, particularly those speaking a foreign language or those whose testimony as to their symptoms is unreliable because of their tendency to make such answers as they think their interrogator wishes or, through fear or timidity, to deny all clinical symptoms.

Relation between Degree of Splenic Enlargement and Malaria Infection. In a series of 338 cases examined in Lee County a definite correlation was found to exist between the size of the spleen and the amount of malaria as measured by the plasmodia in the peripheral blood. Of 51 persons in whom the spleen was palpable on inspiration, 35.3 per cent revealed plasmodia in the peripheral blood; of 126 with palpable spleen, 34.1 per cent were positive for plasmodia; of 29 with spleen enlarged to one fingerbreadth below the costal margin, 55.1 per cent were positive for plasmodia; of 30 with spleen enlarged to

[1] This statement is based on a paper by the same title read by Dr. Darling before the Southern Medical Association, in November, 1923.

two fingerbreadths below the costal margin, 60.0 per cent were positive to plasmodia; and of 23 with spleen enlarged to three fingerbreadths below the costal margin, 69.5 per cent were positive for plasmodia.

A comparison of the spleen rates, plasmodium rates, and malaria history index of 571 persons examined on thirty plantations in the county showed that the spleen index furnished a more sensitive measure of malaria than the blood index. These persons, whose malaria history index was 37.4, gave a spleen index of 40.8 as compared with a plasmodium index of only 25.2.

Spleen examination will detect cases of malaria acquired the previous season, which may act as carriers of the infection. It is these carriers that infect Anopheles mosquitoes in the spring and summer and give rise to epidemics or seasonal endemicity.

Cause of Spleen Enlargement. The explanation of splenic enlargement in malaria is probably to be found in the causes which lead to the segregation of defunct and infected erythrocytes in the spleen and to the phagocytosis of malarial pigment by splenic endothelium. In infections and reinfections there is an interesting correspondence between the appearance of plasmodia in the peripheral blood, the enlargement of the spleen, the diminution of hemoglobin, and reduction in the number of erythrocytes. As the spleen diminishes in size after the access of fever there is an improvement in the blood picture: the hemoglobin and the blood cells increase to normal.

Very large spleens are encountered in regions where malarial endemicity is high and among people who are underfed and therefore unable to throw off the infection promptly. In the Orient, where greatly enlarged spleens are common, coarse methods are employed in detecting the degrees of enlargement. In the southern United States, where there is less underfeeding and fewer examples of the more pronounced type of splenic enlargement in malaria, it is probable that finer methods of detection and a more delicate scale of measurement will have to be used.

Fig. 40.—Malaria cases among school children between the ages of six and twelve in a typical rural county of Georgia, as shown by spleen examinations. The rate varied from zero in some schools in the hilly parts of the county to 92 per cent in districts with numerous mosquito-breeding places

Method of Spleen Examination. In order to elicit the lesser degrees of spleen enlargement and the better to determine the exact degree of enlargement of any spleen, it is necessary to place the patient in a recumbent position

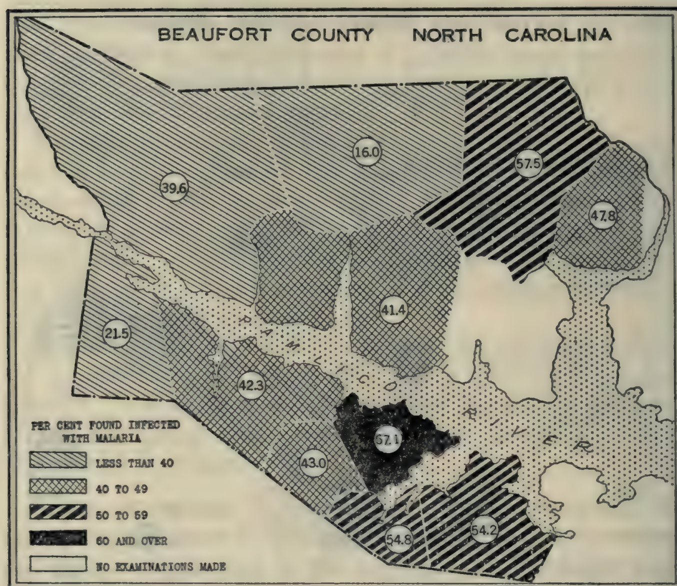

Fig. 41.—Incidence of malaria, by townships, Beaufort County, North Carolina, based on blood examinations. An average of 44.8 per cent of the 6,292 persons examined were infected

with the thighs and legs flexed. The clothing is loosened so that the fingers of the examiner can be placed upon the bare skin of the abdomen, above and below the costal margin. If the spleen is not immediately palpable the patient is instructed to take a deep breath. As he does so the examiner presses the abdomen slightly with his finger tips at the costal margin. If the spleen is enlarged it may then be felt as it descends, being pushed down by the diaphragm. Care must be taken not to press too deeply lest the margin of the spleen be missed.

The spleen may be palpated more easily in children between the ages of two and twelve years than in those younger or older. For this reason and for the equally important one that children who have always lived in a region where malaria is endemic are less apt to have en-

larged spleens after the age of puberty than before, it is advisable in obtaining the spleen rate to limit examination to children between the ages of two and twelve.

Spleen and Blood Indices Variable Factors. Malaria is such a constantly varying infection, whether contemplated in an individual, in a community, or in the mosquitoes which carry the disease from one person to another, that it is not to be supposed that given rates or indices obtain for more than a short space of time or that it is possible to secure a clear picture of the disease at rest. The cross section is constantly changing. Dr. Darling in a study of a large group of prisoners in the Netherlands Indies who were exposed to malaria night after night without screening or other protection, noted a constant flux of blood and spleen rates within the group. The spleen and blood indices of the prisoners were ascertained on several successive occasions. It was found that plasmodia appeared in the blood films of the various men in large numbers and then declined. Spleens enlarged to enormous size and later diminished in bulk. Hemoglobin rates in similar manner waned and waxed as the infection came under control through the activity of the bodily mechanism of defense. It is noteworthy that while the prisoners as a whole yielded the same plasmodium and spleen indices on each examination, the individuals with infected blood or enlarged spleens were not the same on each occasion. Thus it is evident that spleen and blood rates are only relative indices of malaria. A negative blood or spleen does not preclude the presence of the infection. Persons once infected with malaria may remain so for a long period of time—often for years—and the infection will manifest itself in periodic relapses of illness.

II

USE OF FISH FOR MOSQUITO CONTROL

Primarily for the use of its field staff, the Board has prepared a brief summary or digest of all the available literature on the use of fish for mosquito control. This information will shortly be published in pamphlet form and made available to all who are interested. Fish control is not a new method, but carefully controlled experiments capable of demonstrating its limitations and advantages have only recently been made. The literature is more extensive than important for most of it is of a controversial nature and rests on a slender scientific footing. The period of groping and of desultory opinions based on speculation rather than on accurate observation seems to be passing. Within limits, "perhaps not so narrow as may be supposed," the use of fish to control mosquito breeding is ready to take an important place as a recognized measure in both yellow fever and malaria control.

It is impossible to review here the more or less extensive experimental work which has been carried on in many countries, but some of the more important general aspects of the subject are briefly referred to in the following paragraphs.

The Early Use of Fish for Mosquito Control. Science is indebted to the laity for calling attention to the utility of fish for mosquito control. It has long been a matter of common observation that fish consume the larvae of various kinds of insects and in many parts of the world they have been used to rid wells, ponds, tanks, and other containers of mosquito larvae. Between 1890 and 1899 Ross investigated the larvicidal activities of fish and found minnows in India that could each devour in a few seconds a dozen or more larvae. He noted also that fish and larvae

lived together in ditches and in rice fields. The immunity of Barbados from malaria he thought might be due to a local fish known as "millions." It was not until about 1900 that an active interest was taken in the subject and experiments, all of them disconnected and some of them incomplete, were begun in various parts of the world. The results of the early investigations were not altogether satisfactory, as some of them were merely laboratory experiments lacking the necessary field tests, while others, though made in the field, were not followed up in such a way as to show definite results.

Biological Method of Combating Insects and Other Pests. The use of larvivorous fish in the control of mosquito breeding to supplement drainage, oiling, and other methods may be referred to as the biological method of combating the insect. For many years similar procedures have been studied and advocated in closely allied fields and in some cases have been successfully practiced. In the insect world the precarious foothold that each species maintains in the face of its numerous enemies makes it quite possible for man to take a hand in their struggle for existence and so change the environment that flourishing and pernicious insects are overcome and reduced to harmlessness.

This principle has formed the basis of much of the successful work of the Bureau of Entomology of the United States Department of Agriculture. A striking and widely known example was the virtual eradication of the white or cottony cushion scale (icerya) which, accidentally introduced from Australia about 1886, threatened to destroy the entire lemon and orange industry of California. Five years later, after a small beetle (*Novius cardinalis*, also known as vedalia) which feeds exclusively on this scale, had been brought from Australia and released in great numbers in the California orchards, scarcely a scale was to be found. The vedalia was subsequently introduced into other countries with the same complete success. After the leaf-hopper had seriously damaged the sugarcane crop in Hawaii in 1903, the introduction of several active

parasites resulted in the practical elimination of the hopper. In Italy the silk industry was saved by the introduction of a minute parasite of the Diaspis insect, which threatened to destroy the mulberry trees upon which the silkworms feed. In Spain when the orange trees were attacked by certain coccids, the introduction of small beetles known to feed on the eggs of these pests proved most useful in checking their ravages. The control of the Hessian fly, the cabbage-worm, and the San José scale are other examples of the use of the biological method.

Dangers of the Biological Method. Unless applied by experts the biological method is not without danger. Florida fruit-growers thought that the vedalia, which had been introduced so successfully into California, would also destroy their local variety of scale, but in importing the insect they not only obtained no relief but actually introduced a new kind of scale which had been put into the shipping boxes for the vedalia to feed on. Moreover, the natural enemies of pests may themselves become serious pests after they are introduced. The few rabbits originally taken to Australia and New Zealand for purposes of sport have become a nuisance and have caused the abandonment of large areas that had been under cultivation, while attempts to introduce weasels and other animals to prey upon the rabbits have resulted in depredations by the weasels on poultry yards, about the only part of the farm left untouched by the rabbits. Again, the English sparrow, brought into the United States to suppress the snow-white linden moth and held by various entomologists to have succeeded in practically exterminating this shade-tree pest in cities, has itself become such a pest that some states are paying bounties for killing it. The introduction of the wrong fish may result in the elimination of other smaller fish that are useful in keeping down the breeding of mosquitoes.

Objections to Fish Control. Objection to the control of mosquito production by the use of fish has been made on the ground that nature tends to establish a balance

Fig. 42.—A typical lime-sink in Georgia—a breeding place of *A. quadrimaculatus* in summer and autumn and of *A. punctipennis* in winter

Fig. 43.—Seining top-minnows for use in stocking other waters to control mosquito breeding

Fig. 44.—Log pond in Mississippi. Mosquito breeding in ponds of this type is easily controlled by the use of top-minnows

Fig. 45.—Cleaning the shore of a pond so that even when the water is at its highest point there will be no vegetation to prevent the fish from reaching the mosquito larvae

between mosquito larvae and fish, the evidence being that in some regions fish and larvae have lived together naturally for a long period of time. It is also maintained that a given volume of water yields a continuous food supply large enough for only a limited number of fish. If a water area in which mosquito breeding is prolific at certain seasons is already supporting fish to its full capacity, the introduction of additional fish is useless because enough fish will die to restore the permanent balance between food and fish.

All arguments of this sort, however, are adequately answered by pointing out the simple fact that fish have been successfully used not only against the yellow fever mosquito but also against the malaria mosquitoes which breed under the conditions referred to by most of the critics. Many independent investigations and experiments have shown that within certain definite limits excellent results can be obtained by applying the biological method to mosquito control. Where there is apparent failure the trouble usually is that not enough fish or not the right kind of fish are used or that for some reason the fish cannot get at the larvae.

Fish as Mosquito Destroyers. The first three stages of the life cycle of the mosquito, that is the egg, larva, and pupa, are all aquatic. Antimosquito work therefore relies almost exclusively upon destruction of the insect in the aquatic stage, for while its habitat is fixed, accessible, and easily located it can be destroyed on a large scale. Under the most favorable conditions this period lasts about two weeks. If the temperature is low or other adverse conditions are present it may be longer. During this stage the immature insect is constantly exposed to attacks from its enemies, aquatic birds, insects, and especially fish for which the eggs, larvae, or pupae are tempting tidbits. The active movements of the larvae and pupae are of aid in attracting the attention of nearby enemies. Sometimes when the larvae seem to sense the approach of a foe —probably from the agitation of the water, which acts upon their sensitive mouth-hairs—they will sham death

or escape detection by concealing themselves very effectively between the leaves of aquatic plants, among bits of tree-bark, dead leaf stems, or other floatage. The removal of such natural hiding places is necessary to give their enemies free access to the larvae.

Kinds of Fish Required for Malaria Control. The problems of yellow fever and of malaria control are quite different so far as the use of fish is concerned. The fish required for malaria work must be at home in natural collections of water. Since the aquatic forms of Anopheles are surface dwellers, the fish should usually be top-feeders. They should be able to work their way among such vegetation and floatage as may harbor the larvae, and in order to escape from destruction by larger fish they should be small and inclined to frequent very shallow water. The sanitarian's part in malaria control by fish, after stocking the mosquito-breeding waters, consists in removing vegetation and floatage, guarding against destruction by large fish and other water animals, and replacing the larvivorous fish when necessary.

A large part of the literature on the control of mosquitoes by means of fish has to do with the malaria mosquito, because malaria is much more prevalent and widespread than yellow fever. Mr. W. P. Seal, formerly of the United States Bureau of Fisheries, summarizes various factors in choosing fish for malaria mosquito control in a number of questions: Do they live in quiet or open water? Do they swim amid aquatic and semi-aquatic vegetation? Are they solitary or gregarious? Are they sluggish, lethargic, or active? Are they carnivorous, herbivorous, or omnivorous? Are they bottom-feeders, top-feeders, current-feeders, or variable? Are they destructive of other fish? Are they found where there are mosquitoes?

In general, for malaria control small fish of the families of Cyprinodontidae or Poecilidae, found in low altitudes in all parts of the world, are most useful. One variety known as "millions" (*Lebistes reticulatus*) has earned a reputation, perhaps not entirely deserved, as a mosquito destroyer in the Barbados and elsewhere. It is closely related to the

Gambusia affinis, and like that species perhaps does its best work in its native habitat. In India, where fish have been experimented with to a greater extent than in any other country except the United States, the genus Haplochilus has been found to meet all requirements. Under different conditions different fish may prove satisfactory.

Type of Fish Selected for Yellow Fever Control. Unlike malaria mosquitoes, the yellow fever mosquito (often referred to as *Stegomyia fasciata*, but now correctly designated as *Aëdes aegypti*) never flies far from human habitation. It is a town rather than a swamp mosquito. Its entire life cycle may take place largely indoors, and its eggs are laid not only in gutters, barrels, cans, troughs, and other artificial receptacles, but also in the regular water containers used in tropical countries where water is scarce and must be most carefully conserved.

For yellow fever control, where the fish must live in containers, it has been necessary to experiment with various species before a satisfactory one is found. Dr. M. E. Connor's experience in Ecuador is perhaps representative. Gambusia were first tried but were not hardy enough to withstand the frequent dipping of water from containers. The next fish experimented with was a variety of perch known locally as the *huaija* (*Lebiasina bimaculata*) which could withstand rough treatment, but proved too restless, often jumping three or four feet to escape from the container. It was therefore abandoned for the *chata*, a sardine (*Astyanax bosconamericus*), which apparently has the good qualities of the *huaija* without its defects. The *chata*, however, was not plentiful and was consequently more expensive than the *chalaco* (*Dormitator latifrons*) which was finally adopted as the most satisfactory. The *chalaco*, like the *life* (*Pygidium piurae E.*), used with success in Peru, is a bottom-feeder.

Since the Stegomyia breeds only in artificial containers, there is generally no need for helping the fish to gain access to the larvae. These larvae, although they come to the top for air, spend most of their time at the bottom of the receptacle. Hence either a bottom- or a top-feeding fish

may be efficient, although the former is given preference. Fish for Stegomyia control must be frequently renewed, for only a few are allowed in each container. Frequently they jump out and they are constantly in danger of being dipped or poured out of the water. They may be injured by the dipping utensil, by sudden changes of temperature, or insufficient light. The problem of protecting fish used for Stegomyia control is therefore quite different from protection in malaria control. In general a tougher fish is used and the chief problems are those of inspection and replacement.

Gambusia affinis. In the United States there is a general consensus of opinion that various species of the top-minnow are best adapted to mosquito control and that among these *Gambusia affinis*[1] takes first place. This is a hardy fish readily adaptable to many different natural conditions, as well as to life in an aquarium. It thrives in quiet, fresh, or brackish water, which may be very shallow provided it is not foul. If the proper amount of food is available, it withstands a relatively high temperature. The food which it seeks at the surface of the water consists largely of insect larvae, though it sometimes eats its own kind, especially in aquaria. A medium-sized female has been known to destroy 165 large mosquito larvae in a single day. The Gambusia may be changed from fresh to salt water without apparent harm. In moderately cold weather it becomes inactive and ceases to feed. It is not a very active swimmer and becomes an easy prey to large fish when it ventures into deep water.

[1] A full account of many other varieties of fish, with special reference to their use in mosquito control, accompanied by illustrations, will be found in a pamphlet entitled "The Use of Fish in Mosquito Control," which will be sent on application to the International Health Board. The Board also has the following reprints for distribution to those who are interested: "The use of an Indigenous Fish in Combating Malaria," by H. H. Howard; "Fish as Mosquito Destroyers," by M. E. Connor; "Some personal experiences with Fish as Antimosquito Agencies in the Tropics," by Daniel M. Molloy; "Suggestions for Developing a Campaign to Control Yellow Fever," by M. E. Connor.

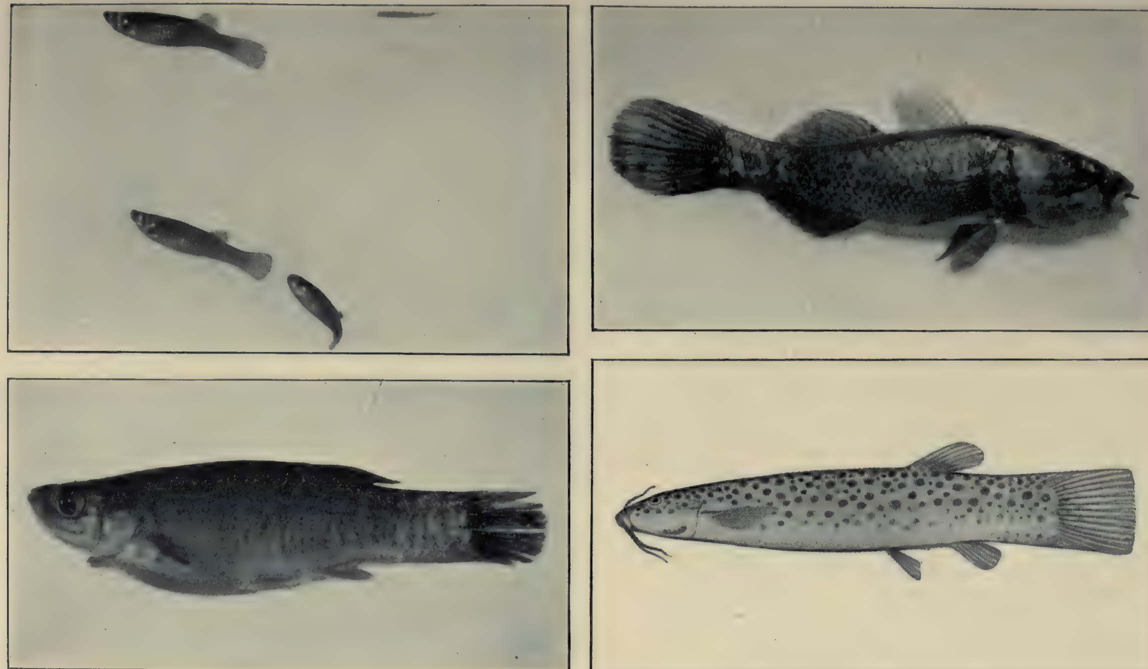

Fig. 46.—Four of the most useful fish for the control of mosquito breeding. *Top: left*, *Gambusia affinis*, the best known of the top-minnows; *right*, *Dormitator latifrons*, or *chalaco; bottom: left*, *Fundulus heteroclitus*, or barred killifish; *right*, *Pygidium piurae E.*, popularly known in South America as "life" (pronounced lefa)

Fig. 47.—A "mojarrito" hatchery in Merida, Mexico

Fig. 48.—Artificial pond in public garden in Bahia, Brazil. Fish are being bred in this pond for use in combating the yellow fever mosquito

As it is viviparous the young do not need a special environment. New broods occur every month or six weeks from the latter part of April until October. Some broods number as high as 100, but the average is probably less than thirty-five. The young are about one-half inch long, very active and hardy. They may attack larvae immediately after birth. The proportion of males to females is about one to eight or nine. Sometimes the early broods produce young later in the same season.

This fish is found from the Ohio Valley southward and as far north as southern Illinois, but it has not yet been determined to what extent it can be acclimatized to northern waters. The shore-line should provide shallows so that the young fish can escape from the cannibalism of larger species. It is usually not possible to keep any except the smallest bodies of water free from predatory fish and other enemies of the Gambusia, among which is to be reckoned the watersnake. Some authorities, however, consider that the presence of large fish, such as the bass, is an advantage since they tend to keep the minnows in the shallow water where they are able to do the most effective work.

An Indigenous Fish Usually Best. Most experimenters now agree that for mosquito control it is best to use an indigenous fish. A special study must be made in each case of the kinds of fish available, their habits, and the conditions under which they are to be used. If native species are not used, the imported variety must sometimes be acclimatized and allowed to adjust itself gradually to its new habitat. In choosing a fish it is not sufficient to know that it will eat mosquito larvae under laboratory conditions; habits of the species in the water into which it is to be introduced must be verified. The fish used most successfully are ordinarily those found most abundantly in the regions in which the mosquitoes occur. The minnow or carp family (Cyprinidae), widely distributed throughout Europe, Asia, northern Africa, and North America, constituting the majority of the fresh-water fish in those areas,

have been used to a limited extent. More extensively useful are the top-minnows, erroneously associated with the Cyprinidae or minnows. Top-minnows belong to the order of Cyprinodontes. The important families are the Cyprinodontidae and the Poecilidae. The latter family includes the ordinary viviparous genera such as Gambusia and Lebistes. The former includes the ordinary oviparous killifish, including the genus Fundulus.

In the United States one particular top-minnow, the *Gambusia affinis*, has found extensive application. It occurs in Southern waters and it is doubtful whether it can be accustomed to Northern and colder climates. A natural mosquito destroyer for the Atlantic Coast is the killifish or salt-water minnow. In addition to these there are the goldfish, several varieties of small sunfish, and the roach or shiner, which is widely distributed. Goldfish are good for small ponds, but are lethargic, likely to grow too large, and being omnivorous and cannibalistic but few of the young survive. The little flat sunfish, or pumpkinseed, has been thought of as good for general purposes. It abounds everywhere except in cold mountain streams, and, unlike the top-minnow, is spiny-rayed so that it is not so easy a prey for larger fish. It eventually grows too large, but the young remain small for a considerable time.

Advantages and Limitations of Fish Control. In the recent campaigns against yellow fever in Central and South America fish have come to be considered indispensable. Their use has been uniformly successful because the water containers to be dealt with are obvious and at all times subject to human control. The effectiveness of a suitable fish when properly cared for is remarkable. A typical instance of the activity of a larva-consuming fish is related in a recent article by Dr. D. M. Molloy, who tells of a single despised catfish which kept a shallow well in Corinto, Nicaragua, clear of mosquito larvae for more than three years, and earned the frying pan for his pains when the well was finally closed and a pump installed. For malaria work, although drainage is probably of first importance

because of the permanency of the results, it is necessary in many cases for reasons of expense to resort to other methods such as oiling and fish control. The value of oiling is not underestimated. Yet the price of oil and labor costs for its distribution are high, especially when operations over large areas are contemplated. An oil film is destroyed by rain and wind storms, and subject to the same disadvantages as fish when floatage and vegetation are encountered. The cost of removing such obstructions is about the same for oil as for fish, but fish control is less liable to accident and more likely to be enduring in its results. If a native variety of fish is used, the initial cost is very small and the second season is likely to find the fish more firmly installed and doing better work than the first. If a body of water is permanent, not chemically polluted, nor obstructed by vegetation, there seems to be no reason why the right kind of fish may not be extremely useful for the control of mosquito breeding. It has been shown many times that no mosquito larvae will survive in bodies of water free from floatage and vegetation, properly edged, and amply stocked with a satisfactory species of fish.

III

ISOLATION OF HOOKWORM LARVAE FROM THE SOIL

Cort and his co-workers in the course of their investigations into the life of hookworm larvae in the soil made successful use of the Baermann apparatus for isolating infective larvae.[1] From these studies it appeared that an important practical use might be made of the Baermann apparatus for locating the exact sources of human infestation. If spots of infested soil likely to cause reinfection following a campaign could readily be located, steps could then be taken to eradicate them.

Use of Baermann Apparatus in Porto Rico. In the course of his intensive work in the model area in the municipality of Quebradillas, Porto Rico, Earle attempted to use the Baermann apparatus to determine the extent of the danger of reinfection caused by lightly infected persons in the absence of latrines. Serious difficulties of various kinds were encountered. In many cases the preceding latrine campaigns seemed to have caused the pollution to become more scattered, so that it was difficult to locate infested spots. Nevertheless, soil samples of about one pint each from polluted spots around fifty-two houses were collected and examined, using the Baermann apparatus and following the procedure described by Cort. Larvae were found in only nine of the fifty-two samples. It seemed probable, however, that larvae may actually have been present in other samples and not detected, for the accuracy of the method was found to depend largely on the skill of the operator. But, assuming that these examinations were accurately performed and that the

[1] Cort, W. W., J. E. Ackert, D. L. Augustine, and Florence K. Payne. Investigations on the Control of Hookworm Disease. II. The Description of an Apparatus for Isolating Infective Hookworm Larvae from Soil. *American Journal of Hygiene*, Baltimore, Jan., 1922, v. 2, pp. 1–16.

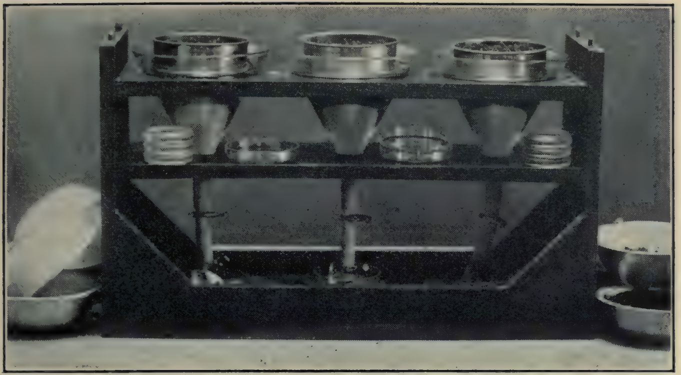

Fig. 49.—Baermann apparatus used in field work for making soil infection surveys and for demonstrating the presence of hookworm larvae in the soil as a part of the educational work preceding a campaign

Fig. 50.—A popular demonstration of hookworm larvae in the soil, in Nicaragua. People who see a mass of infective larvae extracted from the soil are much more willing to take the treatment for hookworm disease and to cooperate in measures for preventing soil pollution

Fig. 51.—Six children in one family in Dutch Guiana all heavily infected with hookworms

Fig. 52.—School children waiting for hookworm treatment, San Salvador

method is capable of demonstrating the presence of larvae in relatively small numbers, Earle concluded that light human infections do not result in heavy soil infestation, even in the absence of latrines.

Use of Baermann Apparatus in Making Popular Demonstrations of Hookworm Larvae. In certain countries the Baermann apparatus is being used successfully in the educational work of the hookworm campaigns. One of the most effective methods of pointing out the danger of acquiring hookworm infection from polluted soil is to give a popular demonstration of the presence of infective larvae in a sample of soil. For popular demonstrations of this sort a portable apparatus has been used consisting of pans, funnels, etc., that could be carried in a case 9½ by 16 by 22 inches, resembling a medium sized suitcase (see Figs. 49 and 50). Cort suggests the following procedure: Hookworm larvae can be cultured in large numbers by mixing sterilized sandy soil with feces containing the eggs. The soil can be rid of free-living nematodes by heating it over a flame while stirring it. About four parts of soil to one part of feces should be used for the culture. After a thorough stirring the mixture should be put into a tin pan in a layer about one inch in thickness and kept well moistened. At a favorable temperature (70° to 95° F.) the larvae will reach the infective stage in about six or seven days. If a stool from a heavily infected person is used, the larvae will be present in the culture in large numbers, and it will be possible to demonstrate them in the isolation apparatus.

The funnel part of the apparatus, with the rubber tube on the stem closed, is set up and filled with hot water to a level below that of the bottom of the sieve when this is in place. The soil from the culture is then put into the sieve and this is set in the funnel. The heat from the surface of the water attracts the larvae to the bottom of the sieve, so that when water is poured into the funnel until it is above the soil, they will fall in clouds, and can be seen in the funnel below the sieve. The hot water should be left

below the sieve for at least half an hour before pouring additional water into the funnel, as in this way the larvae can be more effectively drawn out of the soil. Care should be taken that the water poured into the funnel is not hot enough to kill the larvae.

The ease with which hookworm larvae can be dislodged from the soil by the isolation apparatus makes it a simple matter to demonstrate them on the surface of soil. A dark reddish sandy soil is the best for this purpose. In preparing such a demonstration some of the soil may be placed in a Syracuse watch-glass, well moistened, and a large number of infective hookworm larvae placed on it with a pipette. If this preparation is left for several hours, the larvae will come to the surface and can be seen with the naked eye, hand lens, or binocular microscope. If they are sufficiently concentrated they can be easily seen with the unaided eye, often in polyp-like clumps. By breathing on them they can be stimulated to wave backward and forward. Since the position which the larvae assume is like that in nature, it is possible to draw a very convincing lesson from such a demonstration.

IV

FEASIBILITY OF COMPLETE ERADICATION OF HOOKWORM DISEASE FROM A LOCALITY

Theoretically, it should be possible to rid a locality entirely of hookworm infection within a short time by a series of intensive control campaigns. In Porto Rico during the past three years an intensive study was conducted by Dr. Rollo B. Hill and Dr. Walter C. Earle to test the practicability of such an undertaking and to determine what factors tend to prevent its achievement. The methods followed in this study and the conclusions reached are briefly described in the following summary of Dr. Earle's report.

The section chosen for the experiment was situated in the municipality of Quebradillas, in the western end of the island. It was about 6 square miles in extent and had a population of approximately 2,000. This number included farmers living on their own land, laborers, and a rather large proportion of beggars. There were no big plantations within the area.

Prior to the inauguration of curative work latrines were installed in practically all the homes. Many of these, however, lasted only a few months. It was not until well toward the end of the work that all the homes were supplied with latrines of a durable type. On the whole, therefore, sanitary conditions in the area between the close of the first treatment operations and the inauguration of the final campaign could not be characterized as other than fair.

Beginning in January, 1921, three treatment campaigns were conducted practically one year apart. In each campaign general preliminary microscopic examination was made, and all those found with hookworm infection were treated, providing their physical condition permitted. Operations were continued until at least 80 per cent of the

population were negative for helminth ova on microscopic re-examination.

In the first campaign the Howard smear-centrifuge technique of stool examination was employed, and oil of chenopodium and thymol were used as vermifuges. Usually two treatments of the former drug and one of the latter were administered before re-examination. Additional treatments of thymol were given to those who continued positive, but no patient received more than eight treatments. Toward the end of the second campaign the Willis method of examination was adopted and carbon tetrachloride was administered in a small number of cases. In the third campaign the Willis technique was employed in all examinations and carbon tetrachloride was used for all first treatments and occasionally for second treatments. This vermifuge was adopted both because of its reported high efficiency and because it was thought that the worms which had proved resistant to repeated treatments of oil of chenopodium and thymol might yield to a new drug.

Reduction of Hookworm Infection in Three Campaigns. The original infection survey of the experimental area in January, 1921, revealed a hookworm incidence of 87.6 per cent. By the end of the first campaign this rate had fallen to 15.9 per cent. When microscopic re-examinations were made in November, 1922, at the beginning of the second campaign, the infection index was found to have increased to 48.6, which rate was reduced in the course of the second campaign to 11.0 per cent. By September, 1923, when the third campaign was inaugurated, the infection rate had risen to 32.0 per cent, but curative measures again brought it down to 11.0 per cent. Thus, though the infection rate was progressively smaller at the beginning of each succeeding campaign, the percentage of positives in each case was about three times that obtaining at the end of the preceding campaign.

Fluctuation of Infection Rates Due to Inaccuracy of Microscopic Technique. It has frequently been demonstrated that the smear-centrifuge method does not diagnose

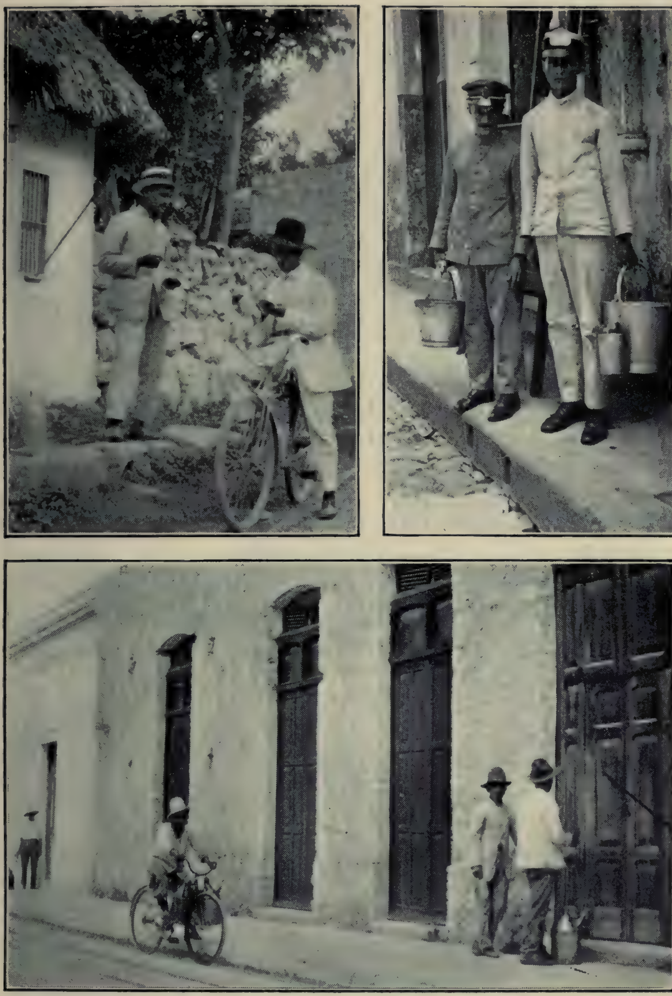

Fig. 53.—*Upper left:* Inspector-general of the yellow fever campaign on a tour of inspection, Merida, Mexico. *Upper right:* An inspector and his helper on their rounds during the yellow fever campaign in Bahia, Brazil. The equipment carried consists of a ladder, a yellow flag, a flashlight, paper, paste, brush, fish, and kerosene. *Bottom:* An inspector and three assistants engaged in "petrolizing" the sewers to prevent the breeding of yellow fever mosquitoes, Merida, Mexico

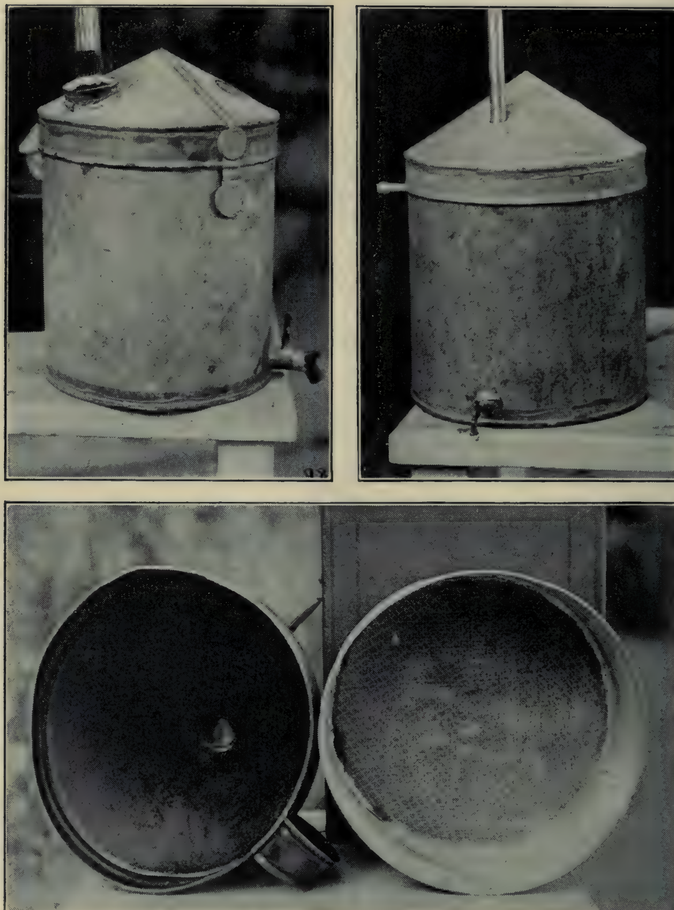

Fig. 54.—*a.* A mosquito-proof tank with the seal conspicuously placed so that the inspector can tell at a glance if cover has been removed or tampered with. *b.* Model used to show improper method of covering tanks. Though apparently mosquito-proof, inspection would show that mosquitoes have easy access to the water through the "down pipe." *c.* Funnels placed over the opening of the tank where the water enters. Besides preventing the entrance of mosquitoes the wire cloth intercepts débris from the house roof

hookworm infection with absolute accuracy. It seemed probable, therefore, that a certain percentage of the changes in the findings in individual cases from campaign to campaign might be attributable to error in microscopic technique. A comparison of the microscopic reports of the three campaigns confirmed this opinion. Cases diagnosed as negative in one campaign were often found positive on resurvey, and some of those reported positive were later found negative though there had been no intervening treatment. In accounting for the former cases the possibility of reinfection could not, of course, be entirely ruled out, and in the latter cases it was necessary to take into consideration the possible natural death of the worms; but it was felt that these factors were not entirely responsible for the fluctuation in the rates.

A tabulation was made in which the cases found positive in the second campaign were classified according to their status in the original campaign, that is, as to whether they had been negative, or positive and then cured, or treated but not cured, or not treated. It was found that 66 per cent of those positive at the beginning of the second campaign had been either negative or cured in the first campaign, while 16 per cent had been treated but not cured, and 18 per cent had not been treated. The latter group included new arrivals in the area.

A study of the data gathered at the beginning of the third campaign showed that 27 per cent of those found negative in the previous campaign had become positive and 17 per cent of the positives had become negative. It is noteworthy that 42 per cent of those previously treated but not cured became negative in the interval between the campaigns. The low percentage of change from positive to negative might be explained by the fact that the more accurate Willis method of examination was used in the third campaign. But if this were the determining factor it would seem that there should have been a higher percentage of cases changing from negative to positive than was found. Furthermore, when 100 cases which had been found negative by the Willis method at the beginning of

the third campaign were re-examined by this same technique two months later, nineteen were shown to be positive. While it is possible that reinfection occurred in the intervening period, it is unlikely that this would reach 19 per cent.

The inaccuracy of the method was further suggested by the fact that seventeen cases found positive in the first campaign but not treated, were all reported negative in the second campaign, while in the third campaign five were found positive.

Occurrence of Reinfection. That a certain amount of reinfection took place in the area in the intervals between campaigns seemed probable both from the conditions revealed by sanitary surveys and from the fact that the number of negative cases becoming positive was higher in some age groups than in others. If no reinfection had occurred the variation should have been approximately the same for all groups.

Between the first and second campaigns the greatest increase in infection occurred among males and females between the ages of 4 and 15 years (50.9 per cent) and among males from 16 to 60 years. The percentage of negative cases becoming positive in this latter group was 46.1 as compared with a percentage of 34.7 for females of the same age group. Among persons 61 years of age or over, the percentage of negatives becoming positive was 42.1. It is members of the age group 4 to 15 years who most often fail to use the latrine and who spend the greatest amount of time about the yard, where soil pollution is likely to exist. The male adults are particularly subject to reinfection during their working hours in the fields and in their wanderings in search of work to other parts of the island where latrine and treatment campaigns have not been conducted.

Between the second and third campaigns the rate of change was still high among males in the age group 16 to 40 years, 35.0 per cent of the negatives becoming positive; but it was relatively lower in the other groups. In the

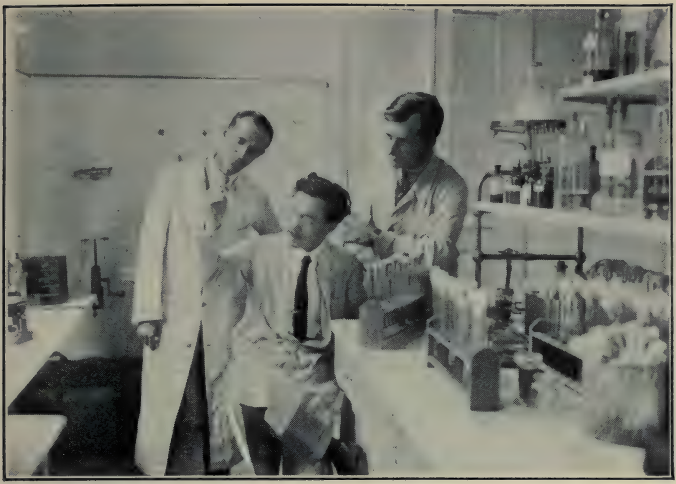

Fig. 55.—Examining cultures of *Leptospira icteroides* from yellow fever cases, in a laboratory of the Oswaldo Cruz Institute, Bahia, Brazil

Fig. 56.—The yellow fever service in Merida, Mexico. The men own the bicycles which they use in patrolling their districts

Fig. 57.—Sanitary agents of the Mexican Yellow Fever Commission starting out on their weekly inspections

Fig. 58.—A hookworm laboratory in Panama

group 4 to 15 years, 31.2 per cent of the negatives became positive; among females between 16 and 40 years, 23.4 per cent became positive; among persons between 41 and 60 years, 21.4 per cent became positive; and among those 61 years of age and over, 27.6 per cent became positive. The systematic latrine reinspection carried on during the second campaign and the consequent improvement in sanitation, together with the fact that there was an unusually light rainfall, may explain the lowered rates.

Old People as a Source of Reinfection. An element of the population that may present a problem of some magnitude in any campaign for the complete control of hookworm infection, is the group of persons of advanced years. Payne, Cort, and Riley called attention to the high rate of infection among the elderly in Porto Rico[1], a rate not surprising in view of the active life of many of these people. It is not unusual to find men and women of 60 years of age and over working on the tobacco and coffee plantations of the island or traveling as mendicants from community to community. It is obvious that these persons may play a considerable part in perpetuating infection. Where possible, therefore, they should be included in the treatment campaigns. Their activity and physical condition should be a test of the advisability of treatment; old age in itself should not be considered a reason for withholding treatment.

Reduction of Infection as Determined by Egg and Worm Counts. With a view to determining the degree of infection obtaining among the persons who were positive for hookworm infection after two campaigns had been conducted, a series of egg counts and worm counts was made at the beginning of the third campaign.

For 1,525 persons whom the microscope had shown to be negative at the end of the second campaign, the average

[1] Payne, G. C., W. W. Cort, and W. A. Riley. Investigations on the control of hookworm disease XX. Human Infestation Studies in Porto Rico by the Egg-Counting Method. *American Journal of Hygiene*, Baltimore, May, 1923, v. 3, p. 315–338.

egg count per slide was 0.6 and the average worm count, 3.3. For 214 persons who had been treated in the previous campaign but not cured, the average egg count was 4.7 and the worm index 25.3. For 77 persons who had not been treated, the egg count was 24.0 and the worm index 164.0. For 138 new arrivals in the area the egg index was 8.5 and the worm index 70.0. The average egg count for the entire population was 2.5 and the worm index was 12.4, the males harboring an average of 16.4 worms and the females an average of 9.1 worms.

As was to be expected, the persons not treated in previous campaigns showed the highest egg and worm indices. A very appreciable degree of infection was found among those treated but not cured. The group previously negative or cured made up 77 per cent of the total population and about 63 per cent of the positive cases, but harbored only 16 per cent of the total number of worms. The group treated but not cured constituted 11 per cent of the population, included 20 per cent of the positive cases, and harbored 16 per cent of the total worms. The groups of those not treated and of new arrivals in the area included only 11 per cent of the population and 16 per cent of the positive cases, but harbored 67 per cent of the total number of worms.

Complete Eradication of Infection Within a Short Time not Practicable. While the majority of those found positive to hookworm infection on resurvey were of the group which had been negative or cured in the previous campaign, the worm index of these persons was so low (3.3) that it would not seem advisable to continue to treat them through a series of campaigns in order to insure the removal of the last hookworms which they might harbor. Moreover, since much of the rise and fall in the infection rate of this group appeared to be due to inaccuracy in the method of stool examination it would be necessary, if complete eradication were to be assured, to disregard the microscope and treat the whole population each year for a period of years, giving each inhabitant a number of

treatments. Since this plan would be impracticable on a large scale, it would seem wiser in recampaign work to disregard the group of persons previously negative or cured, and concentrate attention on those who had not been cured, those who, for medical or other reasons had not been treated, and the newcomers in the area. Thus the heavy infection would be reduced, and if efficient permanent sanitary inspection were maintained to insure the upkeep of a latrine in each home, the light infections would in time eliminate themelves.

V

RELATIVE EFFICIENCY OF VARIOUS METHODS OF HOOKWORM DIAGNOSIS

Of the five methods ordinarily employed in the diagnosis of hookworm disease there is probably none that will detect with absolute accuracy every case of the infection existing in a community. Data on the relative reliability of the several methods are furnished by studies made in 1923 by Earle in Porto Rico on the Willis floatation, the egg-count, and the worm-count methods of stool examination, and by Strode in Brazil on the Willis, direct smear, and centrifuge techniques.

Comparative Results of Willis, Egg-Count, and Worm-Count Methods. In Earle's studies 43 per cent of the cases diagnosed as negative by the Willis technique yielded worms following treatment. Stoll's egg-count method[1] was found even less accurate, for it failed to find ova in 60, or 12.6 per cent, of 477 specimens which the Willis method had shown to be positive. The worm count, too, failed in certain instances. No worms were found in 16, or 8.1 per cent, of a series of 198 counts made on persons found positive by the Willis technique. In five of the sixteen cases eggs had been found by the egg-count method, the average count being 1.0 per slide. The majority of the sixteen patients had been treated in previous campaigns, and it is possible that they retained a few worms which for some reason could not be reached by anthelmintics. A tabulation of the number of persons found positive by each of the three methods of examination showed 58.5 per cent positive according to worm counts, 31.4 positive according to the Willis technique, and 28.7 per cent positive by egg count.

Relative Accuracy of Willis, Direct Smear, and Centrifuge Methods. In the Strode studies, 12,270 fecal speci-

[1] A brief account of Stoll's dilution-count method will be found in the Ninth Annual Report of the Board (1922), pages 107–108.

mens were examined by the direct smear and Willis techniques; the specimens negative according to the smear method, 5,321 in number, were centrifuged and re-examined. By the Willis technique 69.1 per cent of the specimens examined were found positive for hookworm, while only 56.6 per cent were found positive by the direct smear method, and 61.3 per cent by the combined smear and centrifuge methods.[1] The results secured for ova other than hookworm indicate that the several methods vary in efficiency according to the ovum sought. The Willis and direct smear methods gave practically identical results for Ascaris ova, 73.2 per cent as against 73.0 per cent; but when the direct smear and centrifuge methods were used in combination 2.6 per cent more positives were found than by the Willis technique alone. For Trichuris the Willis method was even more efficient than for hookworm, since it gave 16.7 per cent more positives than the combined smear and centrifuge techniques and 27.7 per cent more positives than the direct smear alone. Both Schistosoma and Tenia were found much more frequently with the direct smear or the smear-centrifuge method than with the Willis method. Over five and one half times as many Schistosoma and twice as many Tenia were discovered by the direct smear and centrifuge methods in combination as by the Willis method.

In order that an absolute comparison of the efficiency of the three methods might be made, each specimen that was positive for hookworm was listed according to whether it had been found positive by the Willis method alone, the direct smear alone, the centrifuge alone, or by both the Willis and direct smear, or the Willis and centrifuge, methods. Of the 12,270 persons examined, 71.9 per cent were positive to some one of the microscopic techniques employed: 54.8 per cent of the cases were positive to both the direct smear and the Willis technique, 10.6 per cent were positive to the Willis technique alone, 1.8 per cent to

[1] The technique of microscopic diagnosis by direct smear and by centrifuge was described in some detail in the Sixth Annual Report of the Board (1919), pages 79–82.

the direct smear method alone, 1.0 to the centrifuge method alone, and 3.7 per cent to both the Willis and centrifuge methods. Of the 5,321 cases negative to the direct smear method, 8.7 per cent were positive to both Willis and centrifuge methods, 24.4 per cent to the Willis method alone, and 2.2 per cent to the centrifuge alone.

It will be seen that in these studies the failures of the Willis method were few as compared with the direct smear and the centrifuge methods. It failed to find 1.8 per cent of positive cases which the direct smear method found, but on the other hand it added 14.3 per cent where the smear method failed, and 24.4 per cent where the centrifuge failed.

Economy of Time an Important Advantage of Willis Technique. In the Strode studies an accurate record was kept for two days of the time spent by the microscopist on each slide examination. For the examination of 170 specimens the Willis method required 205 minutes as compared with 400 minutes consumed by the combined direct smear and centrifuge methods. The former method revealed 97 positive cases, and the latter 91. Thus practically one half the time consumed by the smear-centrifuge technique was sufficient to carry out the Willis technique. The total number of hours expended in these examinations was large, but this was due to the fact that specimens were searched thoroughly for ova of all types. Had the search been limited to hookworm ova, much time would have been saved.

STATISTICAL TABLES

NOTES ON TABLE 1

1. Table 1 on the following pages presents a concise statistical summary —by the main geographical divisions of the work, by states and countries, and by years—of the persons examined and treated in the world-wide campaign for the relief and control of hookworm disease aided by the International Health Board. It shows that in the fourteen years from 1910 to 1923, inclusive, a total of 4,387,113 persons have been examined in thirty-seven[1] different states and countries, of whom 2,553,575, or 58.2 per cent, were found infected. Of those infected, 3,441,411, were given at least one treatment; while 2,048,156, or 59.5 per cent, received two or more treatments.

2. Differences between figures which appear in this report and in the 1921 and earlier reports arise (1) from the fact that Table 1 must be prepared for publication each year before final statistical data are received from all areas, and (2) from the further fact that in areas where mass treatment has been followed in previous years the number of persons examined and found infected was estimated on the basis of the findings for those actually examined in preliminary surveys. In the following table the figures represent only those actually examined. It follows, therefore, that for some countries the number of persons treated is in excess of the number of those examined and found infected.

3. The figures in this table do not in all cases represent the exact numbers examined and treated in each country during the calendar year. The statistics show, rather, the total number of persons examined and treated in the areas in which the work was completed and for which final reports were made to the Board during each calendar year. In other words, some of the work reported in this table for each year was actually done in the preceding year but not reported until the campaign in the sub-area was definitely completed.

4. Two treatments of a standard remedy remove, on the average, from 88 to 95 per cent of the worms harbored, depending upon the drug used and the method of administration; and it is seldom that they leave more than ten worms in the intestine. Thus, though some persons may remain lightly infected after two treatments, this number is nevertheless adequate to establish what may be termed a "practical" cure. One treatment, similarly, removes from 75 to 90 per cent of the worms.

[1] See footnote 4, page 207.

5. Though the figures have been itemized by states and countries and by years, this has not been done primarily to invite comparison of the results for one state with those for another, or of one year's work with that of another. Too many variable factors affect the results for such comparisons to be entirely valid. For instance, among other reasons, the variations or fluctuations may be due to the density of population or severity of infection in the areas of operation, to size of working staff, or to differences in the plan of work pursued. In other instances, as in British Guiana in 1919 and Dutch Guiana in 1921, the figures may represent results for only a few months instead of a complete year.

6. The table includes the results of the early dispensary effort aided by the Rockefeller Sanitary Commission in the Southern States. These figures are not itemized by years, but are reported, under the respective states, as the total for the years 1910 to 1914, inclusive. Some of the work for 1914, separately indicated, was aided by the International Health Board. Since 1915, when work by the dispensary plan ceased in these states, the chief effort against hookworm disease has been directed toward the building and use of latrines. Therefore the aggregate figures for examination and treatment are not so large as in previous years, nor do they represent in all cases such thoroughgoing effort in the curative phase of the work.

7. In a number of countries operations were suspended during the war and resumed after its close; in others there have been temporary periods of suspension due to industrial depression, lack of trained directors, or similar causes.

8. Only the results of campaigns aided directly by the International Health Board or Rockefeller Sanitary Commission are included. In a number of countries, as in Brazil, government or voluntary agencies are conducting extensive independent campaigns against the disease, the results of which, if they could be included, would substantially increase the aggregate examinations and treatments.

TABLE 1: *Persons Examined and Treated for Hookworm Disease,* 1910 *to* 1923, *inclusive, in World-Wide Campaign Aided by International Health Board. Figures by main geographical divisions of work, by states and countries, and by years*

Divison, Country, and State	Persons Examined	Persons Found Infected		Persons Given at Least One Treatment	Persons Given Two or More Treatments	
		Number	Per Cent		Number	Per Cent[1]
ALL COUNTRIES						
All years	**4,387,113**	**2,553,575**	58.2	**3,441,411**	**2,048,156**	**59.5**
1910–1914	1,179,406	458,606	38.9	441,408	213,488	48.4
1914	35,100	17,791	50.8	16,106	11,925	74.0
1915	162,835	93,480	57.4	86,242	60,340	70.0
1916	223,976	133,744	59.7	126,834	93,302	73.6
1917	295,103	183,949	62.3	168,429	137,563	81.7
1918	343,867	217,023	63.1	216,757	164,815	76.0
1919	295,883	175,440	59.4	238,352	199,115	83.5
1920	357,289	208,639	58.4	300,632	241,572	87.0
1921	497,015	315,601	63.5	447,980	230,361	51.4
1922	626,172	452,788	72.3	681,474	425,869	62.5
1923	370,467	296,514	80.0	717,197	269.806	37.6
DIVISIONS						
SOUTHERN STATES						
All years	**1,413,000**	**518,668**	**36.7**	**498,333**	**239,921**	**49.0**
1910–1914	1,179,406	458,606	38.9	441,408	213,488	48.4
1914	9,211	2,434	26.4	2,264	653	28.8
1915	18,145	3,961	21.8	3,779	931	24.6
1916	22,169	4,569	20.6	4,544	2,939	64.7
1917	37,299	7,834	21.0	7,596	6,293	82.8
1918	44,241	8,074	18.3	7,636	4,681	61.3
1919	26,282	10,266	39.1	9,391	6,689	71.2
1920	44,644	12,732	28.5	12,528	1,554	12.4
1921	31,603	10,192	32.3	9,187	2,693	29.3

West Indies						
All years	**435,999**	**287,864**	**66.0**	**265,908**	**242,916**	**91.4**
1915	61,604	36,568	59.4	33,648	24,559	73.0
1916	62,642	36,582	58.4	33,077	28,811	87.1
1917	75,779	46,051	60.8	42,739	40,738	95.3
1918	31,314	23,636	75.5	22,057	20,604	93.4
1919	20,350	14,537	71.4	13,534	12,962	95.8
1920	28,890	16,067	55.6	15,274	14,395	94.2
1921	27,402	15,712	63.6	14,443	13,882	96.1
1922	74,311	57,333	77.2	53,656	51,502	96.0
1923	53,707	41,378	77.0	37,480	35,463	94.6
Central America						
All years	**1,268,573**	**795,561**	**62.7**	**763,460**	**534,955**	**70.1**
1914	5,321	2,907	54.6	2,562	578	22.6
1915	83,086	52,951	63.7	48,815	34,850	72.0
1916	131,520	85,235	64.8	82,461	57,534	69.8
1917	127,652	77,585	60.8	71,809	47,204	65.7
1918	173,931	109,193	62.8	95,539	71,316	74.6
1919	175,201	98,857	56.4	86,079	70,061	81.4
1920	148,714	82,272	55.3	70,470	51,016	72.4
1921	138,222	85,444	61.8	71,796	55,634	77.5
1922	172,942	120,943	69.9	103,807	81,985	79.0
1923	111,984	80,174	71.6	130,122	64,777	49.8
South America						
All years	**773,879**	**629,552**	**81.4**	**848,206**	**573,314**	**67.6**
1918	10,490	6,922	66.0	5,894	4,208	71.4
1919	52,775	35,780	67.8	31,233	21,456	68.7
1920	98,956	73,286	75.6	73,901	61,276	82.9
1921	171,764	140,069	81.5	194,598	126,239	64.9
1922	289,322	243,136	84.0	335,347	223,074	66.5
1923	150,572	130,359	86.6	207,233	137,061	66.1

TABLE 1—*Continued*

Division, Country, and State	Persons Examined	Persons Found Infected		Persons Given at Least One Treatment	Persons Given Two or More Treatments	
		Number	Per Cent		Number	Per Cent[1]
THE EAST						
All years	**495,662**	**321,930**	**64.9**	**1,065,504**	**457,050**	**42.9**
1914	20,568	12,450	60.5	11,280	10,694	94.8
1916	7,645	7,358	96.3	6,752	4,018	59.5
1917	54,373	52,479	96.5	46,285	43,328	93.6
1918	83,891	69,198	82.5	85,631	64,006	74.7
1919	21,275	16,000	75.0	98,115	87,947	89.6
1920	36,085	24,282	67.3	128,459	113,331	88.2
1921	128,024	64,184	50.1	157,956	31,913	20.2
1922	89,597	31,376	35.0	188,664	69,308	36.7
1923	54,204	44,603	82.3	342,362	32,505	9.5
SOUTHERN STATES						
Alabama						
All years	**86,995**	**48,852**	**56.2**	**48,114**	**13,370**	**27.8**
1910–1914	74,473	43,718	58.7	43,520	9,857	22.6
1917[2]	564	47	8.3	47	42	89.3
1918[2]	675	79	11.7	79	79	100.0
1919	102	17	16.7	17	15	88.2
1920	4,574	1,335	29.2	1,334	1,227	92.0
1921	6,607	3,656	55.3	3,117	2,150	69.0
Arkansas						
All years	**48,483**	**8,866**	**18.3**	**6,705**	**1,614**	**24.1**
1910–1914	47,983	8,863	18.5	6,702	1,614	24.1
1918[2]	500	3	.6	3	—	—

Georgia						
All years	**75,341**	**46,058**	**61.1**	**45,552**	**14,251**	**31.8**
1910–1914	73,518	45,564	62.0	45,095	14,023	32.2
1919	1,518	373	24.6	336	107	31.8
1920 [2]	305	121	39.7	121	121	100.0
Kentucky						
All Years	**134,855**	**44,404**	**32.9**	**38,611**	**872**	**2.3**
1910–1914	128,991	43,635	34.6	37,916	475	1.3
1915 [2]	1,833	460	25.1	460	316	68.7
1920	2,541	169	6.6	116	56	48.3
1921	1,490	140	9.4	119	25	21.0
Louisiana						
All Years	**74,368**	**39,342**	**52.9**	**38,556**	**14,858**	**38.5**
1910–1914	68,165	37,720	55.3	37,225	14,524	39.0
1914 [2]	2,568	879	34.2	876	324	37.0
1918 [2]	1,161	208	17.9	55	—	—
1921	2,474	535	21.6	400	10	2.5
Mississippi						
All Years	**280,757**	**109,809**	**39.1**	**108,323**	**74,496**	**68.8**
1910–1914	184,944	75,813	41.0	74,598	58,687	78.7
1915	4,414	1,422	32.2	1,410	53	3.8
1916	3,780	1,466	38.8	1,455	1,182	81.2
1917	14,874	4,348	29.2	4,223	4,223	100.0
1918 [2]	8,468	4,084	48.2	4,069	3,541	87.0
1919	16,036	8,479	52.9	8,471	6,461	76.3
1920	31,198	9,730	31.3	9,720	42	.4
1921	17,043	4,467	26.2	4,377	307	7.0

TABLE 1—*Continued*

Divison, Country, and State	Persons Examined	Persons Found Infected		Persons Given at Least One Treatment	Persons Given Two or More Treatments	
		Number	Per Cent		Number	Per Cent [1]
North Carolina						
All Years	**337,179**	**112,639**	**33.4**	**106,828**	**60,264**	**56.4**
1910–1914	300,457	104,279	34.7	99,075	57,538	58.1
1914 [2]	4,837	1,429	29.5	1,321	294	22.3
1915 [2]	3,405	898	26.4	802	228	28.4
1917	9,048	2,057	22.7	1,984	1,149	57.9
1918	18,431	3,503	19.0	3,272	987	30.2
1920	728	238	32.7	142	—	—
1921	273	235	86.1	232	68	29.3
South Carolina						
All Years	**101,442**	**47,696**	**47.0**	**45,812**	**22,853**	**49.9**
1910–1914	81,311	42,677	52.5	41,751	21,413	51.2
1914 [2]	840	90	10.7	31	4	12.9
1915 [2]	3,581	721	20.1	648	230	35.5
1916	6,665	1,991	29.9	1,980	1,206	60.9
1918 [2]	931	24	2.6	—	—	—
1919	4,966	1,057	21.3	327	—	—
1920	2,268	989	43.6	965	—	—
1921	880	147	16.7	110	—	—
Tennessee						
All Years	**81,582**	**22,310**	**27.3**	**21,680**	**16,087**	**74.2**
1910–1914	74,997	21,410	28.5	20,979	15,828	75.4
1915 [2]	1,172	116	9.9	116	20	17.2
1916	1,217	49	4.0	48	23	47.9
1917	856	129	15.1	126	71	56.3
1918	127	3	2.4	3	2	66.7
1919	378	17	4.5	9	3	33.3
1920	608	26	4.3	17	7	41.2
1921	2,227	560	25.1	382	133	34.8

Texas						
All Years	**89,482**	**19,947**	**22.5**	**19,492**	**4,861**	**24.9**
1910–1914	63,376	17,790	28.1	17,490	3,588	20.5
1916 [2]	2,801	570	20.3	568	357	62.9
1917	7,084	1,058	14.9	1,021	662	64.8
1918	11,025	81	.7	70	51	72.9
1919	3,044	322	10.6	230	103	44.8
1920	2,115	123	5.8	112	100	89.3
1921	37	3	8.1	1	—	—
Virginia						
All Years	**102,516**	**18,745**	**18.3**	**18,660**	**16,395**	**87.9**
1910–1914	81,191	17,137	21.1	17,057	15,941	93.5
1914 [2]	966	36	3.7	36	31	86.1
1915 [2]	3,740	344	9.2	343	84	24.5
1916	7,706	493	6.4	493	171	34.7
1917	4,873	195	4.0	195	146	74.9
1918	2,923	89	3.0	85	21	24.7
1919	238	1	.4	1	—	—
1920 [2]	307	1	.3	1	1	100.0
1921	572	449	78.5	449	—	—
WEST INDIES						
Antigua						
Both Years	**18,599**	**2,919**	**15.7**	**2,634**	**2,566**	**97.4**
1916 [2]	7,477	2,229	29.8	2,054	2,031	98.9
1917 [2]	11,122	690	6.2	580	535	92.2
British Guiana						
All Years	**71,322**	**44,073**	**61.8**	**39,906**	**35,394**	**88.9**
1915	21,070	13,135	62.3	11,903	10,039	84.3
1916	18,498	9,808	53.0	8,263	6,225	75.3
1917	16,044	9,508	59.3	8,906	8,722	97.9
1918	11,719	8,727	74.5	8,175	7,900	96.6
1919 [2]	3,991	2,895	72.5	2,659	2,508	94.3

TABLE 1—*Continued*

Division, Country, and State	Persons Examined	Persons Found Infected		Persons Given at Least One Treatment	Persons Given Two or More Treatments	
		Number	Per Cent		Number	Per Cent[1]
Dutch Guiana						
All Years	**44,292**	**38,956**	**88.0**	**35,189**	**33,065**	**94.0**
1916	4,411	3,900	88.4	3,667	3,414	93.1
1917	13,159	12,045	91.5	11,133	10,664	95.8
1921[2]	924	817	88.4	744	714	96.0
1922	11,708	11,371	97.1	10,601	10,182	96.0
1923	14,090	10,823	76.8	9,044	8,091	89.5
Grenada						
All Years	**31,706**	**20,662**	**65.2**	**20,571**	**15,650**	**76.1**
1915	18,584	11,194	60.2	11,522	8,064	70.0
1916	5,312	4,226	79.6	4,147	2,950	71.1
1917	7,810	5,242	67.1	4,902	4,636	94.6
Jamaica						
All Years	**41,604**	**17,569**	**42.2**	**16,059**	**14,852**	**91.6**
1919[2]	2,842	1,552	54.6	1,346	1,291	95.9
1920[2]	13,748	3,915	28.5	3,605	3,203	88.8
1921	9,807	3,085	31.5	2,754	2,635	95.7
1922[2]	6,740	3,281	48.7	2,996	2,859	95.4
1923[2]	8,467	5,736	67.7	5,358	4,864	88.0
Porto Rico						
Both Years	**37,660**	**30,974**	**82.2**	**28,874**	**28,434**	**98.5**
1922	22,413	18,504	82.6	17,223	16,957	98.5
1923	15,247	12,470	81.8	11,651	11,477	98.5
Saint Lucia						
All Years	**48,799**	**30,598**	**63.0**	**29,384**	**24,534**	**83.6**
1915	7,924	4,436	56.0	4,106	2,177	53.0
1916	6,003	2,336	38.9	2,201	1,904	86.5

1917	4,601	3,060	66.5	2,962	2,653	89.6
1918	5,004	3,126	62.5	2,892	2,068	71.5
1919	4,350	2,597	59.7	2,547	2,364	92.8
1920	6,373	4,743	74.4	4,656	4,331	93.0
1921	3,181	2,274	71.5	2,225	2,164	97.3
1922	11,363	8,026	77.4	7,795	6,873	88.2
Saint Vincent						
All Years	**21,915**	**12,758**	**58.2**	**11,905**	**11,383**	**95.6**
1915 [2]	3,822	1,676	43.9	1,590	1,562	98.2
1916	7,494	4,062	54.2	3,748	3,653	97.5
1917	9,482	6,065	64.0	5,683	5,303	93.3
1918 [2]	1,117	955	85.5	884	865	97.8
Trinidad						
All Years	**120,102**	**89,355**	**74.4**	**81,386**	**77,038**	**94.7**
1915 [2]	10,204	6,127	60.0	4,527	2,717	60.0
1916	13,447	10,021	74.5	8,997	8,634	96.0
1917	13,561	9,441	69.6	8,573	8,225	95.9
1918	13,474	10,828	80.4	10,106	9,771	96.7
1919 [2]	9,167	7,493	81.7	6,982	6,799	97.4
1920	8,769	7,409	84.5	7,013	6,861	97.8
1921	13,490	9,536	70.7	8,720	8,369	96.0
1922	22,087	16,151	73.1	15,041	14,631	97.3
1923	15,903	12,349	77.7	11,427	11,031	96.5
CENTRAL AMERICA						
Costa Rica						
All Years	**346,273**	**183,191**	**52.9**	**167,761**	**117,798**	**70.2**
1915	30,297	19,401	64.0	18,816	12,152	64.6
1916	40,579	22,608	55.7	22,037	9,899	44.9
1917	48,488	29,940	61.7	28,909	19,180	66.3
1918	56,371	29,898	53.0	27,487	19,154	69.7
1919	64,371	29,872	46.4	26,551	22,798	85.9
1920 [2]	36,342	10,743	29.6	9,006	6,415	71.2
1921	37,902	18,991	50.1	15,677	12,398	79.1
1922	31,923	21,738	68.1	19,278	15,802	82.0
1923 [5]	—	—	—	—	—	—

TABLE 1—*Continued*

Division, Country, and State	Persons Examined	Persons Found Infected		Persons Given at Least One Treatment	Persons Given Two or More Treatments	
		Number	Per Cent		Number	Per Cent [1]
Guatemala						
All Years	**261,498**	**172,172**	**65.8**	**153,080**	**135,540**	**88.5**
1915 [2]	25,587	15,001	58.6	13,783	11,851	86.0
1916	39,596	26,665	67.3	25,961	23,618	91.0
1917 [2]	13,670	7,198	52.7	6,777	6,552	96.7
1918 [2]	32,861	22,299	67.9	19,950	19,057	95.5
1919	44,495	28,752	64.6	25,283	23,639	93.5
1920	21,469	12,805	58.7	11,429	10,402	91.0
1921	25,405	19,020	74.9	14,337	11,185	78.0
1922	28,673	18,310	63.9	15,651	12,822	81.9
1923	29,742	22,122	74.4	19,909	16,414	82.4
Honduras						
Both Years	**12,191**	**6,363**	**52.2**	**49,284**	**3,164**	**93.2**
1922 [2]	4,903	2,083	42.5	1,547	702	45.4
1923 [3]	7,288	4,280	58.7	47,737	2,462	94.7
Nicaragua						
All Years	**194,924**	**131,840**	**67.6**	**123,385**	**77,271**	**62.6**
1915 [2]	2,192	1,659	75.7	1,298	18	1.4
1916 [2]	12,829	9,073	70.7	8,362	1,166	13.9
1917	33,781	18,422	54.5	16,950	5,652	33.3
1918	24,186	16,760	69.3	15,042	9,524	63.3
1919	12,246	5,820	47.5	4,829	2,146	44.4
1920	41,627	28,964	69.6	24,502	17,157	70.0
1921	23,183	16,312	70.4	13,940	11,265	80.8
1922	37,603	29,139	77.5	24,770	19,466	78.6
1923 [3]	7,277	5,691	78.2	13,692	10,877	79.4

Panama						
All Years	**154,810**	**123,705**	**79.9**	**116,315**	**88,423**	**76.0**
1914 [2]	5,321	2,907	54.6	2,562	578	22.6
1915	25,010	16,890	67.5	14,918	10,829	72.6
1916	30,094	24,193	80.4	23,747	21,340	89.9
1917	16,676	14,088	84.5	13,262	11,126	83.9
1918	16,185	13,656	84.4	11,966	9,537	79.7
1919	15,307	13,490	88.1	11,812	8,313	70.4
1920	13,104	10,050	76.7	8,353	4,009	48.0
1921	5,932	5,014	84.5	4,595	3,151	68.6
1922	18,093	16,219	89.6	13,200	9,445	71.6
1923 [3]	9,088	7,198	79.2	11,900	10,095	84.8
Salvador						
All Years	**298,877**	**178,290**	**59.7**	**153,635**	**112,759**	**73.4**
1916 [2]	8,422	2,696	32.0	2,354	1,511	64.2
1917	15,037	7,937	52.8	5,911	4,694	79.4
1918	44,328	26,580	60.0	21,094	14,044	66.6
1919	38,782	20,923	54.0	17,604	13,165	74.8
1920	36,172	19,710	54.5	17,180	13,033	75.9
1921	45,800	26,107	56.9	23,247	17,635	75.9
1922	51,747	33,454	64.4	29,361	23,748	97.9
1923	58,589	40,883	69.7	36,884	24,929	67.8
SOUTH AMERICA						
Brazil [4]						
All Years	**560,206**	**427,568**	**76.3**	**650,880**	**414,296**	**63.7**
1918 [2]	10,490	6,922	66.0	5,894	4,208	71.4
1919	52,775	35,780	67.8	31,233	21,456	68.7
1920	92,093	67,243	72.2	68,207	56,923	83.5
1921	131,288	101,417	77.7	157,739	92,883	58.9
1922	221,802	181,820	82.0	274,936	172,923	62.9
1923 [3]	51,758	34,386	66.4	112,871	65,903	58.4

TABLE 1—*Continued*

Division, Country, and State	Persons Examined	Persons Found Infected		Persons Given at Least One Treatment	Persons Given Two or More Treatments	
		Number	Per Cent		Number	Per Cent[1]
Colombia						
All Years	**213,673**	**201,984**	**94.5**	**197,326**	**159,018**	**80.6**
1920[2]	6,863	6,043	88.1	5,694	4,353	76.4
1921	40,476	38,652	95.5	36,859	33,356	90.5
1922	67,520	61,316	90.8	60,411	50,151	83.0
1923[3]	98,814	95,973	97.1	94,362	71,158	75.4
THE EAST						
Australia[4]						
All Years	**112,278**	**10,333**	**9.2**	**9,986**	**9,770**	**97.8**
1920[2]	5,008	350	7.0	345	345	100.0
1921	56,710	4,741	8.4	4,434	4,421	99.7
1922–	50,560	5,242	10.4	5,207	5,004	96.1
Borneo						
Both Years	**15,059**	**12,428**	**82.5**	**22,039**	**18,402**	**83.5**
1921[2]	5,325	4,556	85.6	10,568	9,951	94.2
1922	9,734	7,872	80.9	11,471	8,451	73.7
Ceylon						
All Years	**118,941**	**107,488**	**90.4**	**459,261**	**382,215**	**83.2**
1916[2]	7,645	7,358	96.3	6,752	4,018	59.5
1917	42,828	41,613	97.2	35,675	33,440	93.7
1918	26,424	25,624	97.0	50,374	47,181	93.7
1919	15,542	11,852	77.5	88,602	84,712	95.6
1920	16,961	12,814	75.5	117,337	112,089	95.5
1921	497	422	84.9	20,958	16,533	78.9
1922	7,137	5,975	83.7	93,475	52,567	56.2
1923[3]	1,907	1,830	96.0	46,088	31,675	68.7

China						
Both Years	**14,529**	**8,493**	**58.5**	**6,542**	**2,669**	**40.8**
1918 [2]	12,504	7,556	60.4	5,694	2,519	44.2
1919 [2]	2,025	937	46.3	848	150	17.7
Egypt						
1914	20,568	12,450	60.5	11,280	10,694	94.8
Fiji						
All Years	**14,754**	**10,549**	**71.5**	**88,393**	**6,084**	**6.9**
1917 [2]	3,434	3,088	89.9	3,010	2,877	95.6
1918 [2]	3,190	2,887	80.5	2,770	2,674	96.5
1922 [2]	4,417	2,559	57.9	44,440	203	.5
1923 [3]	3,713	2,015	54.3	38,173	330	.9
Mauritius						
1922 [2]	12,643	5,279	41.8	3,680	3,083	83.8
Seychelles						
All Years	**23,819**	**21,004**	**88.2**	**20,251**	**19,386**	**95.7**
1917 [2]	8,111	7,778	95.9	7,600	7,011	92.3
1918	10,475	9,113	87.0	8,671	8,449	97.4
1919	3,708	3,211	86.6	3,127	3,085	98.6
1920 [2]	1,525	902	59.1	853	841	98.6
Siam						
All Years	**163,071**	**133,906**	**82.1**	**444,072**	**4,747**	**1.1**
1918	31,298	24,018	76.7	18,122	3,183	17.6
1919				5,538		
1920 [2]	12,591	10,216	81.1	9,924	56	.6
1921	65,492	54,465	83.2	121,996	1,008	.8
1922	5,106	4,449	87.1	30,391		
1923 [3]	48,584	40,758	83.9	258,101	500	.2

[1] Based on the total number of persons receiving at least one treatment.
[2] Represents part-year effort only.
[3] Mass treatment.
[4] States of Brazil and Australia not indicated separately.
[5] Reports incomplete.

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Grand Total	*$997,280.47*	*$578,367.75*	*$1,121,862.86*	*$1,436,355.00*
Relief and Control of Hookworm Disease	632,089.88	369,988.49	457,936.54	509,091.99
County Health Work	....	182.95	2,494.53	2,439.25
Malaria Control	54,496.97	39,978.58	26,489.29	34,965.08
Yellow Fever Control	41,863.17	9,344.03	46,639.17	94,526.42
Tuberculosis in France	....	51,856.24	433,030.43	602,775.78
Public Health Education	....	1,151.44	35,142.82	36,701.04
Public Health Administration	....	....	....	....
Public Health Laboratory Service	....	....	....	....
Field Staff Salaries, Expenses, etc., Not Prorated to Specific Budgets	29,916.60	9,232.30	5,345.82	21,701.87
Miscellaneous	95,024.51	34,776.06	41,339.58	55,846.90
Administration	143,889.34	61,857.66	73,444.68	78,306.67
Relief and Control of Hookworm Disease	*632,089.88*	*369,988.49*	*457,936.54*	*509,091.99*
United States	137,130.73	53,446.11	87,284.58	110,860.17
West Indies	179,773.15	87,764.12	57,800.06	48,457.24
Central America	160,949.40	98,483.25	113,545.86	111,684.19
South America	4,779.77	43,309.16	97,031.00	157,555.86
The East	133,980.62	84,912.45	97,932.47	80,014.39
Miscellaneous	15,476.21	2,073.40	4,342.57	520.14
United States[2]	*137,130.73*	*53,446.11*	*87,284.58*	*110,860.17*
Alabama	4,343.33	1,235.97	5,922.09	5,283.74
Arkansas	....	2,462.59	2,784.41	....
Georgia	22,822.59	2,436.95	5,418.95	4,604.21
Kentucky	14,633.12	2,200.00	2,064.97	1,978.40
Louisiana	2,342.57	1,278.66	1,317.93	1,370.18
Mississippi	20,505.91	9,223.36	9,427.52	15,773.21
North Carolina	6,309.33	8,548.71	15,775.89	13,924.04
South Carolina	11,516.08	7,967.22	13,870.12	14,754.86
Tennessee	17,687.29	6,585.02	6,642.20	10,201.59
Texas	18,146.91	5,170.48	9,362.85	22,380.20
Virginia	14,026.68	6,337.15	5,947.86	10,012.42

[1] Includes initial deposit under retirement plan.
[2] In September, 1917, the hookworm work in the Southern States began to be absorbed in the programs states than in others, it was not possible to announce until the end of 1920 that in all the states the all efforts directed toward the relief and control of hookworm and other soil-borne diseases.

Years 1913–1923, Inclusive, Covering All Activities

1920	1921	1922	1923	Total
$1,658,572.61	*$1,698,776.26*	*$1,868,892.12*	***$2,452,728.84***	*$11,812,835.91*
621,520.98	457,409.50	498,996.06	**413,833.90**	3,960,867.34
8,182.77	167,996.90	214,854.79	**216,898.80**	613,049.99
133,929.02	150,291.34	161,455.14	**163,099.14**	764,704.56
139,757.40	236,755.46	211,980.51	**321,136.91**	1,102,003.07
518,013.51	359,540.31	268,274.49	**82,041.52**	2,315,532.28
68,373.54	89,092.64	164,675.97	**498,365.74**	893,503.19
12,708.81	20,736.31	68,917.73	**185,903.85**	288,266.70
....	16,109.70	26,325.29	**32,180.74**	74,615.73
26,074.89	38,936.95	64,781.19	**[1]247,734.39**	443,724.01
38,539.49	38,916.59	17,719.15	**14,682.99**	336,845.27
91,472.20	122,990.56	170,911.80	**[1]276,850.86**	1,019,723.77
621,520.98	*457,409.50*	*498,996.06*	***413,833.90***	*3,960,867.34*
136,019.06	15,730.39	7,510.26	**5,960.29**	553,941.59
61,857.73	85,541.60	110,039.59	**116,828.44**	748,061.93
98,303.98	83,920.99	86,922.83	**90,714.46**	844,524.96
206,486.22	150,344.49	170,298.81	**70,361.78**	900,167.09
113,472.55	115,805.46	116,718.54	**99,648.03**	842,484.51
5,381.44	6,066.57	7,506.03	**30,320.90**	71,687.26
136,019.06	*15,730.39*	*7,510.26*	***5,960.29***	*553,941.59*
17,256.71	....	....	**25.00**	34,066.84
....	....	....	....	5,247.00
4,525.39	....	....	....	39,808.09
16,599.03	....	....	....	37,475.52
....	....	....	....	6,309.34
20,709.72	....	....	....	75,639.72
10,463.00	....	....	....	55,020.97
17,210.63	....	....	....	65,318.91
13,533.22	....	....	....	54,649.32
14,723.99	....	....	....	69,784.43
14,965.17	....	....	....	51,289.28

of the rapidly developing county departments of health. The period of transition being longer in some county health departments would henceforth assume as one of their regular functions, responsibility for

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Relief and Control of Hookworm Disease—*Continued*				
United States—*Cont'd*				
Administration.....	$........	$........	$8,749.79	$10,577.32
County Dispensary Work in the South	4,796.92	....	....	....
Resurveys.........	....	....	....	....
West Indies............	*179,773.15*	*87,764.12*	*57,800.06*	*48,457.24*
Antigua...........	14,834.97	4,758.87	....	....
Barbados (survey)..	1,651.31	....	....	....
British Guiana[1]....	41,565.87	19,231.23	16,504.11	9,984.28
Cayman Islands (survey).........	....	1,795.16	....	....
Dominica (survey)..	....	....	....	....
Dutch Guiana[1].....	14,933.39	19,168.40	4,389.11	613.23
Grenada...........	27,751.78	7,778.80	1,833.74	....
Jamaica...........	....	....	3,937.85	9,832.48
Porto Rico.........	....	....	....	....
Santo Domingo (survey).........	....	....	....	....
St. Kitts (survey)...	....	....	....	....
St. Lucia..........	17,086.26	6,865.60	8,152.28	8,109.32
St. Vincent........	15,994.33	9,384.18	6,383.25	....
Tobago (survey)....	....	1,072.22	....	....
Trinidad..........	32,307.77	10,898.37	12,301.48	15,293.43
Administration.....	13,647.47	6,811.29	4,298.24	4,624.50
Central America........	*160,949.40*	*98,483.25*	*113,545.86*	*111,684.19*
British Honduras (survey).........	4,273.47	....	....	....
Costa Rica........	43,189.49	21,752.31	21,330.40	20,492.01
Guatemala.........	22,552.53	13,346.70	20,816.27	19,514.73
Honduras..........	....	....	....	....
Nicaragua.........	26,353.10	19,418.74	22,454.30	26,164.44
Panama...........	52,038.20	22,881.75	24,312.26	18,565.05
Salvador..........	10,925.24	21,083.75	17,573.90	17,162.10
Administration.....	1,617.37	....	7,058.73	9,785.86
South America.........	*4,779.77*	*43,309.16*	*97,031.00*	*157,555.86*
Brazil.............	4,779.77	43,309.16	97,031.00	155,430.38
Colombia..........	....	....	....	2,125.48
Paraguay..........	....	....	....	....

[1] For administrative reasons British and Dutch Guiana, although on the mainland of South America,
[2] Reports incomplete.

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$6,032.20	$........	$........	$........	$25,359.31
....	....	....	....	4,796.92
....	15,730.39	7,510.26	5,935.29	29,175.94
61,857.73	*85,541.60*	*110,039.59*	*116,828.44*	*748,061.93*
....	....	2,552.67	....	22,146.51
....	....	....	....	1,651.31
486.37	1,281.02	248.37	....	89,301.25
....	....	....	....	1,795.16
....	....	....	89.32	89.32
570.34	12,917.66	17,786.64	19,416.68	89,795.45
....	....	....	....	37,364.32
18,400.09	16,949.24	23,241.56	[2]21,280.54	93,641.76
7,823.35	18,290.86	28,450.98	30,395.06	84,960.25
1,077.07	....	....	....	1,077.07
....	....	....	1,989.24	1,989.24
11,444.57	8,545.88	9,378.80	9,182.04	78,764.75
....	....	....	....	31,761.76
....	....	....	....	1,072.22
16,016.71	17,489.50	17,590.83	23,460.87	145,358.96
6,039.23	10,067.44	10,789.74	11,014.69	67,292.60
98,303.98	*83,920.99*	*86,922.83*	*90,714.46*	*844,524.96*
....	....	....	....	4,273.47
20,219.60	14,061.92	6,355.05	4,979.63	152,380.41
17,126.43	15,362.58	18,467.99	16,246.60	143,433.83
....	....	10,802.41	14,286.73	25,089.14
18,745.12	21,479.43	15,790.55	12,980.46	163,386.14
20,061.02	23,496.22	18,675.03	29,407.59	209,437.12
14,973.80	3,520.84	8,283.79	5,271.68	98,795.10
7,178.01	6,000.00	8,548.01	7,541.77	47,729.75
206,486.22	*150,344.49*	*170,298.81*	*70,361.78*	*900,167.09*
193,560.95	131,709.52	148,602.50	46,592.10	821,015.38
12,925.27	18,634.97	21,696.31	22,217.48	77,599.51
....	....	....	1,552.20	1,552.20

are considered West Indian colonies.

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Relief and Control of Hookworm Disease—*Continued*				
The East	*$133,980.62*	*$84,912.45*	*$97,932.47*	*$80,014.39*
Uncinariasis Commission to Orient	34,910.67	16,572.64	....	....
Australia	....	4,074.84	18,633.50	15,902.95
British North Borneo	....	....	....	....
British Solomon Islands (survey)	....	....	....	....
Ceylon	23,658.91	30,340.00	36,041.44	32,497.87
China	....	3,981.58	12,400.87	12,187.58
Egypt	26,074.78	....	....	....
Fiji Islands	3,386.37	5,776.92	5,579.84	....
Java (survey)	327.66	....	....	....
India	....	....	....	....
Mauritius	....	....	....	....
Seychelles Islands	4,522.35	7,409.69	8,089.06	8,291.90
Siam	6,147.52	6,458.57	13,042.15	7,514.66
Administration	34,952.36	10,298.21	4,145.61	3,619.43
Miscellaneous	*15,476.21*	*2,073.40*	*4,342.57*	*520.14*
Field Studies:				
Alabama	....	....	....	....
Brazil	....	....	....	....
Ceylon	....	....	....	....
China	....	....	....	....
Porto Rico	....	....	....	....
Thymol	15,476.21	....	....	....
Research in carbon tetrachloride	....	....	....	....
Study of methods of diagnosing hookworm disease	....	....	....	43.95
Conferences of Health Officers	....	2,073.40	2,990.76	....
Motion Picture Film	....	....	....	....
Salvador:				
Portable house and office	....	....	945.35	476.19
Loss from earthquake	....	....	406.46	....
Dutch Guiana, Care and storage of motor boat	....	....	....	....

[1] Reports incomplete.

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$113,472.55	*$115,805.46*	*$116,718.54*	***$99,648.03***	*$842,484.51*
....	....	....	....	51,483.31
35,417.41	39,912.29	35,375.57	33,745.09	183,061.65
3,106.23	7,440.10	5,641.00	3,101.75	19,289.08
....	1,378.85	225.60	....	1,604.45
33,779.28	23,689.34	15,041.57	[1]7,020.31	202,068.72
....	....	....	....	28,570.03
....	....	....	Cr. 8,952.64	17,122.14
....	498.64	10,653.55	7,594.37	33,489.69
....	....	....	....	327.66
7,810.00	12,496.30	9,883.53	10,275.40	40,465.23
5,688.56	....	7,356.43	12,235.10	25,280.09
4,643.03	....	....	....	32,956.03
15,850.03	18,429.18	23,993.28	27,086.88	118,522.27
7,178.01	11,960.76	8,548.01	7,541.77	88,244.16
5,381.44	*6,066.57*	*7,506.03*	***30,320.90***	*71,687.26*
....	....	....	14,524.06	14,524.06
....	....	1,006.35	220.96	1,227.31
....	....	356.35	85.09	441.44
....	....	....	7,434.94	7,434.94
....	3,618.83	5,358.26	....	8,977.09
....	....	....	....	15,476.21
....	....	....	9,455.85	9,455.85
....	500.00	758.57	....	1,302.52
2,488.71	....	....	....	7,552.87
2,817.73	1,584.74	....	....	4,402.47
75.00	....	26.50	1,400.00	123.04
....	....	....	....	406.46
....	363.00	....	....	363.00

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
County Health Work	*$........*	*$182.95*	*$2,494.53*	*$2,439.25*
United States:				
Alabama	....	....	....	....
California	....	....	....	....
Florida	....	....	....	....
Georgia	....	....	....	....
Illinois	....	....	....	....
Indiana	....	....	....	....
Iowa	....	....	....	....
Kansas	....	....	....	....
Kentucky	....	....	....	....
Louisiana	....	....	....	....
Maryland	....	182.95	2,494.53	2,264.25
Minnesota	....	....	....	....
Mississippi	....	....	....	....
Missouri	....	....	....	....
New Mexico	....	....	....	....
North Carolina	....	....	....	....
Oregon	....	....	....	....
South Carolina	....	....	....	....
Tennessee	....	....	....	....
Texas	....	....	....	....
Virginia	....	....	....	....
West Virginia	....	....	....	175.00
Wyoming	....	....	....	....
Administration	....	....	....	....
Canada:				
New Brunswick	....	....	....	....
South America:				
Brazil	....	....	....	....
Malaria Control	*54,496.97*	*39,978.58*	*26,489.29*	*34,965.08*
Co-operative Demonstrations:				
United States:				
Alabama	....	....	....	....
Arkansas	11,104.58	4,276.23	4,749.02	13,505.66
California	....	....	....	....
Georgia	....	....	....	....
Illinois	....	....	....	....
Louisiana	....	....	....	....
Mississippi	43,392.39	35,702.35	21,740.27	21,167.37
Missouri	....	....	....	....
North Carolina	....	....	....	....
South Carolina	....	....	....	....
Tennessee	....	....	....	....
Texas	....	....	....	....
Virginia	....	....	....	....
Administration	....	....	....	....

[1] Reports incomplete.

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$8,182.77	*$167,996.90*	*$214,854.79*	**$216,898.80**	[1] *$613,049.99*
....	18,231.35	21,915.97	**19,966.46**	60,113.78
....	....	607.22	**6,250.00**	6,857.22
....	237.75	772.08	....	1,009.83
....	4,338.17	2,790.68	**1,537.72**	8,666.57
....	....	1,927.94	**1,849.99**	3,777.93
....	....	1,641.66	**2,250.00**	3,891.66
....	....	954.18	**181.33**	1,135.51
4,494.00	6,316.99	13,095.38	**7,349.13**	31,255.50
....	16,316.41	16,057.84	**16,802.48**	49,176.73
....	5,618.28	15,397.64	**14,184.73**	35,200.65
....	1,815.36	7,168.18	**3,720.00**	17,645.27
....	....	....	[1] **2,585.53**	2,585.53
....	15,652.72	11,713.47	**20,238.91**	47,605.10
....	600.00	9,391.41	**9,575.00**	19,566.41
....	10,837.52	8,510.73	**6,879.86**	26,228.11
957.04	14,413.38	7,169.78	**9,041.86**	31,582.06
....	....	4,441.17	**6,138.42**	10,579.59
....	17,651.97	12,302.18	**13,929.78**	43,883.93
....	14,686.42	14,421.51	**10,950.54**	40,058.47
....	12,944.58	13,765.55	[1] **11,386.40**	38,096.53
....	13,972.74	11,319.44	**11,710.39**	37,002.57
2,731.73	4,164.56	5,089.15	**8,223.28**	20,383.72
....	....	....	**399.75**	399.75
....	10,198.70	12,887.71	**14,316.45**	37,402.86
....	....	9,000.00	[1] **6,722.55**	15,722.55
....	....	12,513.92	**10,708.24**	23,222.16
133,929.02	*150,291.34*	*161,455.14*	**163,099.14**	*764,704.56*
8,906.92	7,650.06	15,416.93	**8,232.07**	40,205.98
7,048.90	4,777.15	6,388.11	**4,274.13**	56,123.78
....	....	3,111.12	....	3,111.12
1,230.86	....	2,017.08	**3,756.74**	7,004.68
....	....	422.80	**1,006.84**	1,429.64
30,699.94	23,095.51	17,365.78	**4,519.76**	75,680.99
27,537.43	21,185.61	8,901.06	**12,692.71**	192,319.19
....	1,471.37	2,900.00	**3,200.00**	7,571.37
7,526.13	18,416.25	9,046.96	**9,292.94**	44,282.28
13,942.74	13,321.90	10,892.31	[1] **7,556.95**	45,713.90
1,969.94	1,512.56	3,659.65	**1,963.50**	9,105.65
11,472.34	10,347.23	2,307.84	[1] **5,213.64**	29,341.05
5,284.84	831.65	6,062.08	**8,981.35**	21,159.92
6,032.20	10,198.68	5,523.30	**8,589.87**	30,344.05

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Malaria Control—*Continued*				
Field Studies and Experiments				
United States:				
Georgia	$........	$........	$........	$........
Louisiana	....	....	....	....
Maryland	....	....	....	....
Mississippi	....	....	....	....
Foreign:				
Argentina	....	....	....	....
Brazil	....	....	....	292.05
Ecuador	....	....	....	....
Italy	....	....	....	....
Nicaragua	....	....	....	....
Palestine	....	....	....	....
Philippine Islands	....	....	....	....
Porto Rico	....	....	....	....
Miscellaneous:				
Conference of Malaria Workers	....	....	....	....
Motion picture film	....	....	....	....
Yellow Fever Control	*41,863.17*	*9,344.03*	*46,639.17*	*94,526.42*
Yellow Fever Commission	41,863.17	7,727.74	....	44,271.12
Brazil	....	....	....	....
Colombia	....	....	....	....
Countries bordering on Caribbean Littoral and Amazon Valley	....	1,616.29	2,897.97	....
Ecuador	....	....	29,473.98	48,396.77
Mexico and Central America	....	....	14,267.22	1,858.53
Peru	....	....	....	....
Training of Personnel	....	....	....	....
Vaccine and Serum	....	....	....	....
History of Yellow Fever	....	....	....	....
Administration	....	....	....	....
Tuberculosis in France	....	*51,856.24*	*433,030.43*	*602,775.78*
Inauguration of Work	....	18,671.74	....	....
Departmental Organization	....	....	....	....

[1] Reports incomplete.

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$........	$........	$........	**$15,182.09**	$15,182.09
....	....	....	**205.17**	205.17
....	....	....	**2,447.88**	2,447.88
....	....	....	**156.34**	156.34
....	5,661.02	....	....	5,661.02
....	....	22,043.09	**20,429.27**	42,764.41
4,595.59	....	....	....	4,595.59
....	....	....	**127.24**	127.24
425.66	6,662.51	8,091.00	**13,701.47**	28,880.64
....	....	7,250.11	[1] **10,271.44**	17,521.55
....	....	6,077.50	**8,623.03**	14,700.53
5,445.18	24,914.84	23,978.42	**6,532.42**	60,870.86
1,810.35	245.00	....	**375.98**	2,431.33
....	....	....	**5,766.31**	5,766.31
139,757.40	*236,755.46*	*211,980.51*	***321,136.91***	*1,102,003.07*
83,717.13	....	....	**239.97**	177,819.13
....	461.30	469.68	**91,819.27**	92,750.25
....	....	....	**32,519.51**	32,519.51
....	....	....	**6,332.05**	10,846.31
28,574.98	1,698.06	3,017.05	....	111,160.84
27,465.29	154,260.47	163,219.91	**154,842.05**	515,913.47
....	80,335.63	36,041.68	....	116,377.31
....	....	3,000.00	**8,875.04**	11,875.04
....	....	6,000.00	**3,786.06**	9,786.06
....	....	232.19	**6,481.45**	6,713.64
....	....	....	**16,241.51**	16,241.51
518,013.51	*359,540.31*	*268,274.49*	***82,041.52***	*2,315,532.28*
....	....	....	....	18,671.74
139,364.76	47,281.28	24,044.27	....	210,690.31

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Tuberculosis in France—*Cont'd*				
Public Health Visiting	$........	$........	$........	$........
Educational Division	....	5,316.39	85,755.19	141,053.34
Medical Division	....	9,576.01	267,237.59	389,328.32
Contingent Fund	....	....	....	....
Postgraduate Tuberculosis Courses	....	....	....	....
Comité National	....	....	....	....
Central Administration	....	18,292.10	80,037.65	72,394.12
Public Health Education	....	*1,151.44*	*35,142.82*	*36,701.04*
Schools of Hygiene and Public Health				
Brazil—São Paulo	....	179.59	32,788.84	23,582.57
Czechoslovakia—Prague	....	....	....	....
England—London	....	....	....	....
Poland—Warsaw	....	....	....	....
Study and Training Courses for Health Officers	....	....	....	....
Fellowships	....	971.85	2,353.98	13,118.47
Study of Teaching Hygiene and Public Health in Medical Schools	....	....	....	....
Public Health Administration	....	....	....	....
United States:				
Aid in developing State Health Services				
Sanitary Engineering				
Iowa	....	....	....	....
Louisiana	....	....	....	....
Missouri	....	....	....	....
Montana	....	....	....	....
Tennessee	....	....	....	....
Texas	....	....	....	....
Utah	....	....	....	....
Vital Statistics				
Georgia	....	....	....	....

[1] Reports incomplete.

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$76,191.46	$101,473.08	$99,525.30	$54,759.09	$331,948.93
135,920.64	79,839.90	62,422.55	....	510,308.01
80,226.08	40,621.01	....	....	786,989.01
....	750.00	2,490.94	4,766.70	8,007.64
....	....	5,044.15	....	5,044.15
....	....	....	22,515.73	22,515.73
86,310.57	89,575.04	74,747.28	....	421,356.76
68,373.54	*89,092.64*	*164,675.97*	*498,365.74*	*893,503.19*
29,929.01	24,725.36	20,561.52	5,404.19	137,171.08
....	204.51	3,416.41	[1] 2,260.00	5,880.92
....	....	22,774.78	[1] 209,023.55	231,798.33
....	....	....	92,200.00	92,200.00
....	3,466.64	3,286.02	2,958.07	9,710.73
38,409.84	60,696.13	114,637.24	186,519.93	416,707.44
34.69	....	....	....	34.69
12,708.81	*20,736.31*	*68,917.73*	*185,903.85*	*288,266.70*
....	....	....	3,495.12	3,495.12
....	....	....	457.72	457.72
....	....	1,050.00	368.43	1,418.43
....	....	....	927.57	927.57
....	....	....	642.55	642.55
....	....	....	1,423.50	1,423.50
....	....	636.33	345.00	981.33
....	....	....	400.00	400.00

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Public Health Administration—*Continued*				
United States—*Cont'd*				
Epidemiology				
Utah........	$........	$........	$........	$........
Virginia......	....	....	....	....
Foreign:				
Australia........	....	....	....	....
Brazil..........	....	....	....	....
Czechoslovakia...	....	....	....	....
Philippine Islands	....	....	....	....
League of Nations				
Interchange of Public Health Personnel....	....	....	....	....
Development of Epidemiological Intelligence Service.	....	....	....	....
Training Health Officers in Vital Statistics.	....	....	....	....
Public Health Laboratory Service........	....	....	....	....
United States:				
Alabama........	....	....	....	....
Arkansas........	....	....	....	....
Kansas..........	....	....	....	....
Missouri.........	....	....	....	....
Montana........	....	....	....	....
Oregon..........	....	....	....	....
Tennessee........	....	....	....	....
Virginia.........	....	....	....	....
Central America:				
Costa Rica.......	....	....	....	....
Guatemala.......	....	....	....	....
Honduras........	....	....	....	....
Nicaragua.......	....	....	....	....
Salvador.........	....	....	....	....
Demonstrations.....	....	....	....	....
Administration.....	....	....	....	....

[1] Reports incomplete.

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$........	$........	$........	**$151.14**	$151.14
....	....	....	**3,536.81**	3,536.81
....	....	20,000.00	**21,432.73**	41,432.73
....	....	14,630.10	**25,616.23**	40,246.33
12,708.81	20,736.31	5,534.47	**7,720.00**	46,699.59
....	....	12,046.83	**18,873.44**	30,920.27
....	....	15,020.00	[1] **64,652.72**	79,672.72
....	....	....	**29,215.44**	29,215.44
....	....	....	**6,645.45**	6,645.45
....	*16,109.70*	*26,325.29*	***32,180.74***	*74,615.73*
....	....	3,261.03	**9,973.47**	13,234.50
....	....	....	[1] **1,676.16**	1,676.16
....	2,539.88	5,468.14	**2,693.88**	10,701.90
....	....	874.99	....	874.99
....	....	....	**676.74**	676.74
....	....	....	**900.00**	900.00
....	....	250.00	**2,888.45**	3,138.45
....	....	....	**899.51**	899.51
....	....	....	**303.14**	303.14
....	307.50	621.75	**1,581.36**	2,510.61
....	....	....	[1] **4,222.71**	4,222.71
....	85.18	2,445.53	**3,271.69**	5,802.40
....	984.34	1,028.72	**3,093.63**	5,106.69
....	....	206.33	....	206.33
....	12,192.80	12,168.80	....	24,361.60

TABLE 2: *Expenditures of the International Health Board for the*

Activity, State, and Country	July 1, 1913–Dec. 31, 1916	1917	1918	1919
Miscellaneous........	*$95,024.51*	*$34,776.06*	*$41,339.58*	*$55,846.90*
Surveys and exhibits	44,850.43	13,854.57	14,970.85	16,896.80
Library...........	1,844.12	....	....	....
Philippine Hospital Ship...........	25,000.00	....	12,500.00	6,500.00
Investigation of sewage disposal in rural homes........	664.39	5,359.11	4,288.01	778.60
Medical commission to Brazil........	18,513.47	....	....	....
Adviser in Medical Education.......	....	11,225.19	1,500.00	1,666.67
Investigation of powdered milk.......	....	....	....	....
Paris Conference on International Nomenclature of Causes of Death...	....	....	....	....
Compilation of mining sanitary code..	....	....	....	....
Smallpox vaccine for Vera Cruz, Mexico	....	....	....	....
Plans for laboratory at Nictheroy, Brazil.............	....	....	....	....
Traveling expenses of visiting public health authorities.	2,561.36	....	....	....
Field equipment and supplies..........	742.88	2,464.68	3,000.00	23,434.94
Pamphlets and charts	847.86	1,335.66	4,016.89	5,499.50
Express, freight, and exchange........	....	536.85	1,063.83	1,070.39

Years 1913–1923, Inclusive, Covering All Activities—Cont'd

1920	1921	1922	1923	Total
$38,539.49	*$38,916.59*	*$17,719.15*	*$14,682.99*	*$336,845.27*
24,996.05	13,437.76	....	....	129,006.46
....	....	....	....	1,844.12
....	....	....	....	44,000.00
....	....	....	....	11,090.11
....	....	....	....	18,513.47
....	....	....	....	14,391.86
500.00	....	....	....	500.00
615.30	....	....	....	615.30
....	125.98	77.20	....	203.18
....	....	....	165.62	165.62
....	....	....	429.98	429.98
....	7,660.12	2,113.62	3,619.19	15,954.29
5,996.96	4,982.25	5,189.62	6,688.08	52,499.41
5,873.33	10,153.44	8,869.43	3,057.48	39,653.59
557.85	2,557.04	1,469.28	722.64	7,977.88

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CHINA MEDICAL BOARD

Report of the Director

To the President of the Rockefeller Foundation:

Sir:

I have the honor to submit herewith my report as Director of the China Medical Board for the period of January 1, 1923, to December 31, 1923.

Respectfully yours,

ROGER S. GREENE,

Director.

CHINA MEDICAL BOARD

OFFICERS AND MEMBERS

1923

Chairman and General Director
George E. Vincent[1]

Director
Roger S. Greene

Acting Resident Director in China
Henry S. Houghton

Assistant Resident Director in China
L. Carrington Goodrich

Secretary
Edwin R. Embree

Assistant Secretary
Margery K. Eggleston

Members

Wallace Buttrick[1]
Simon Flexner
Raymond B. Fosdick[1]
Frederick L. Gates
Frank J. Goodnow
Roger S. Greene
Harry Pratt Judson[2]
Vernon Kellogg[1]
John R. Mott
Francis W. Peabody
John D. Rockefeller, Jr.
Wickliffe Rose[1]
George E. Vincent[1]
William H. Welch

[1] Member of Executive Committee.
[2] Resigned December 5, 1923.

CHINA MEDICAL BOARD

OFFICERS AND MEMBERS

1924

Chairman and General Director
George E. Vincent[1]

Director
Roger S. Greene

Acting Resident Director in China
Henry S. Houghton

Assistant Resident Director in China
L. Carrington Goodrich

Secretary
Edwin R. Embree

Assistant Secretary
Margery K. Eggleston

Members

John G. Agar[2]
Wallace Buttrick[1]
Simon Flexner
Raymond B. Fosdick[1]
Frederick L. Gates
Frank J. Goodnow
Roger S. Greene
Vernon Kellogg[1]
Paul Monroe
John R. Mott
Francis W. Peabody
John D. Rockefeller, Jr.[1]
Wickliffe Rose
George E. Vincent[1]
William H. Welch

[1] Member of Executive Committee.
[2] Temporary service on the Executive Committee of the Rockefeller Foundation, which constituted him a member also of the China Medical Board and of its Executive Committee.

TABLE OF CONTENTS

CHINA MEDICAL BOARD

The work of the China Medical Board in 1923 consisted mainly in the further development of projects initiated in previous years, particularly in the fields of medical education and college science teaching. Some aid was continued to hospitals not connected with medical schools, but the movement for the elevation of hospital standards has now gained such strength as to justify confidence that it will continue to go forward with the help of the communities which the hospitals are serving. Since further progress must depend mainly on the supply of qualified doctors and nurses, a greater concentration of effort on the strictly educational features of the Board's program has seemed appropriate.

I. MEDICAL EDUCATION

Peking Union Medical College

The principal contribution to medical education is still made through the Peking Union Medical College.

In the summer of 1923 the first class, consisting of three students, having completed the four-year course of formal instruction entered the hospital

for the year of interne service which is required for the degree.

Enrollment

The following table shows the gradual increase of enrollment in all departments of the College:

Medical College	*1921–1922*	*1922–1923*	*1923–1924*
Fourth-year class	0	4	5
Third-year class	5	5	9
Second-year class	6	9	16
First-year class	11	17	23
Total	22	35	53
Premedical School			
Third-year class	18	22	18
Second-year class	21	17	12
First-year class	24	32	26
Total	63	71	56
School of Nursing	*1921–1922*	*1922–1923*	*1923–1924*
Fourth-year class	0	0	1
Third-year class	0	1	6
Second-year class	1	7	5
First-year class	8	6	4
Total	9	14	16
Graduate and special students	59	131	79 *
GRAND TOTAL	153	251	204

* To February 29, 1924.

The graduate and special students include some persons taking undergraduate courses, some short intensive graduate courses, and others doing special work in the laboratories and clinics under the supervision of the staff. Both men and women are admitted to all departments except the School of Nursing which now accepts only women for its undergraduate course.

Staff

The gradual enlargement of the teaching staff of the College and the increase in numbers and responsibility of the Chinese teachers is shown by the following figures:

	1921–1922		*1922–1923*		*1923–1924*	
Medical School	*Chinese*	*Foreign*	*Chinese*	*Foreign*	*Chinese*	*Foreign*
Professors	0	7	0	7	0	9
Associate professors	0	6	1	7	2	7
Assistant professors	0	0	0	1	0	2
Associates	4	12	6	16	4	18
Assistants	5	5 (2 part-time)	15	5	24	3
Total	9	30	22	36	30	39
Premedical School						
Assistant professors	0	4	0	5	0	5
Instructors	1	4	1	4	1	6
Assistants	2	2	4	4	5	3
Total	3	10	5	13	6	14
School of Nursing	0	2	0	2	1	2 †
Totals	12	42	27	51	37	55

† Much of the instruction of nurses is given by members of the premedical and medical faculties. These figures do not include graduate nurses without formal teaching duties of whom there were at the end of the year 1923, twenty-seven who had been trained in the United States, Canada, or Great Britain.

Visiting Professors

During the calendar year 1923 there were also at Peking the following visiting professors and lecturers: Dr. H. R. Slack, of the Johns Hopkins Medical School, in otolaryngology (completing a year's appointment); Dr. Reid Hunt, of the Harvard Medical School, in pharmacology (three months); Dr. C. U. Ariens Kappers, of the Dutch Central Institute for Brain Research, in anatomy (beginning a six months' appointment); Dr. W. T.

Councilman, of the Harvard Medical School, in pathology; Dr. W. W. Cort, of the Johns Hopkins School of Hygiene and Public Health, in parasitology; and Dr. Adalbert Fuchs, of Vienna, in ophthalmology, all beginning a year's service; and Dr. L. Emmett Holt, lately of the College of Physicians and Surgeons of Columbia University, whose death occurred just as he was preparing to return to the United States after a visit of three months. All of these visitors have rendered service of great value, but it is appropriate to make special record at this time of the important contribution which Dr. Holt made, not only through teaching and helping to plan for the development of pediatrics in China, but also through the example he set to other departments by his constant emphasis on health conservation.

The annual exchange of lecturers with the South Manchuria Medical College took place in November. Professor T. Masuda of the South Manchuria Medical College at Mukden came to Peking to give a series of papers on recent Japanese work on beriberi, while Professor Cort lectured in Mukden on his hookworm studies.

After the great earthquake in Japan the College invited eight medical scientists on the staff of the Imperial University at Tokyo, to come to Peking and continue their researches in the

College laboratories, thus providing another useful means of contact between the medical schools of China and Japan. The party arrived in November, 1923, and was to remain until the spring of 1924.

Graduate Courses

Short courses or other special facilities for graduate study were provided during the year in medicine, surgery, ophthalmology, obstetrics and gynecology, neurology, pediatrics, anatomy, physiological chemistry, pharmacology, bacteriology, pathology, school hygiene, and nursing. Fellowships covering tuition, maintenance and, in some cases, traveling expenses, were granted to forty-one Chinese and thirty-eight foreign doctors, nurses, and technicians to enable them to take one or more of these courses.

Laboratories for Clinical Research

A number of improvements were made in the laboratories of the clinical departments, special rooms being fitted up for work in pediatrics, metabolism, dermatology, and neuropathology.

Field Study of Kala-Azar

Special funds were provided during 1923 for a field study of kala-azar. Through the courtesy of the physicians of the Southern Presbyterian Mission at Hsuchowfu on the Tientsin-Pukow

Railway, much of the work will be done at the hospital of that mission which is located in the middle of one of the most heavily infected areas in China. The special kala-azar clinic maintained at this hospital gave about 5,000 treatments for this disease in the twelve months ending June 30, 1923. Dr. C. W. Young, assistant professor of medicine at Peking, who has made notable improvements in methods of detecting and culturing the parasite, is in charge of the expedition and he will be assisted by an entomologist, Dr. Marshall Hertig, lately of the University of Minnesota. Preliminary surveys of the principal endemic areas of North China were made in 1923. The more intensive effort was to begin in January, 1924, and to continue through the whole calendar year. The main object is to learn, if possible, something of the way in which the disease is transmitted.

A list of papers published by members of the staff in 1923 is annexed to this report (see pages 265–270). While investigations have been in progress on subjects not covered in this list, the titles show in a general way the nature of the studies in which the several departments have been engaged.

Revision of Curriculum

The faculty in consultation with the visiting professors have been engaged recently in plan-

Fig. 59.—Conference in dissecting room, anatomy building, Peking Union Medical College

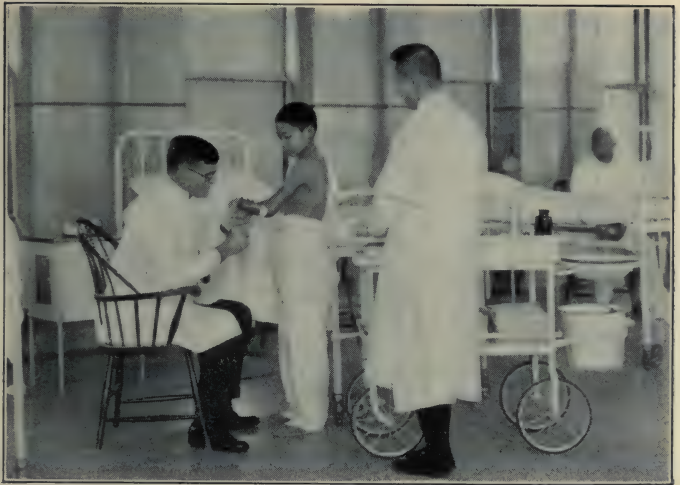

Fig. 60.—Surgical ward of Peking Union Medical College Hospital

Fig. 61.—Students examining patients in eye clinic, Peking Union Medical College Hospital

Fig. 62.—Bacteriological laboratory, department of medicine, Peking Union Medical College

ning a revision of the curriculum designed to bring into closer relation the study of the fundamental medical sciences and the application of these sciences to the study and treatment of disease. The conditions at Peking appear to be particularly favorable for carrying out an experiment of this kind, on account of the small classes and the absence of restrictions by local examining boards.

The Hospital

There has been a considerable increase in the number of patients treated in the hospital, as shown in the following table:

	1921–1922	*1922–1923*
In-patients	2,653	3,403
Out-patients (total visits)	74,763	77,301

The number of beds available for patients was increased during the last half of the year from 197 to 213, distributed as follows: medicine 58 (including 16 for pediatrics), neurology 8, general surgery 53, gynecology 7, obstetrics 18, ophthalmology 11, otolaryngology 8, private and semi-private wards 31, observation ward 11, isolation 8.

The proportion of autopsies to the total number of deaths in the hospital is still too small, being only 27.47 per cent for the year ending June 30, 1923. The actual number of autopsies on hospital patients in this period was fifty,

as compared with thirty-three autopsies, or 21.4 per cent of the total deaths, in the previous year.

Co-operation with Other Institutions

There have been several opportunities for useful co-operation with other institutions. Instruction in pathology and bacteriology was given to students of the North China Union Medical College for Women, who registered for this purpose as special students during the year 1922–1923. The department of pathology has also conducted a diagnostic service available for the present without charge to other hospitals in China. During the year 1922–1923, 356 specimens submitted by seventy-eight physicians were reported upon. Dr. C. E. Lim, of the division of bacteriology, gave considerable time to his duties as a member of the Board of Control of the Epidemic Prevention Bureau, a government institution of great promise, which is at present occupied mainly with the preparation of vaccines and serums. Dr. J. B. Grant, of the division of hygiene and public health, assisted in the teaching of this subject in the National Medical College at Peking, and is serving as chairman of the executive committee of the Council on Health Education. The departments of obstetrics and pediatrics have participated in the work of a social service organi-

zation which has started a health center for maternity and child welfare work near the College, and the departments of dermatology and roentgenology have undertaken the control and treatment of scalp infections among the children at the Western Hills Orphanage, where the department of ophthalmology had previously carried out effective measures for dealing with trachoma.

Shantung Christian University

The Shantung Christian University School of Medicine at Tsinan, with which the Board has been co-operating since 1916, received an important reinforcement in 1923 through the consummation of the plans for merging with it the North China Union Medical College for Women, previously maintained at Peking as an independent institution. This adds to the supporters of the school two strong bodies of women, the Women's Foreign Missionary Society of the Methodist Episcopal Church, and the Women's Committee of the Board of Foreign Missions of the Presbyterian Church in the U. S. A. As a part of their contribution toward the joint enterprise the women's organizations undertook to add five teachers to the staff during the first year, and to provide funds for new buildings and equipment made necessary by the transfer of women teachers and students.

The China Medical Board appropriated $50,000 towards a total of $165,000 for new dormitories, residences, and equipment and for the extension or alteration of the hospital and school buildings. By the end of the year the full amount had been assured and some of the new buildings were already approaching completion.

The first women students were admitted at the opening of the fall term, and other classes were to be transferred during the winter. The beginning of coeducation here as in other institutions in China does not appear to have caused any special complications in spite of the relative novelty of the idea in the Far East.

During the year 1922–1923 there were ninety-six undergraduate students enrolled. Fourteen provinces and one foreign country were represented in the student body. The teaching staff included six Chinese and nineteen British and Americans.

Recent investigation shows that out of 165 graduates 49 are teachers in medical schools or serving interneships in medical school hospitals, 78 are in mission hospitals, 14 in military, railway, or other government hospitals, 16 in Chinese private hospitals, 5 are connected with public health or police departments, 1 is employed by a mining company, and 2 are studying abroad. The tendency for the majority of the

graduates to remain for some years in institutional work is gratifying since the hospitals need their services and under present conditions it is extremely difficult for a Chinese physician to do good work in private practice. The hospital received a grant of Mex. $3,000 from the Provincial Assembly and Mex. $3,250 from private subscriptions (that is, about $3,125 United States currency in all from the Chinese community). The total budget of the medical school and hospital came to about Mex. $155,000.

Hunan-Yale College of Medicine

No new grants were made to other medical schools in 1923 but the Board continued its payments to the Hunan-Yale College of Medicine at Changsha, under previous appropriations.

During the year 1922–1923, there were 41 undergraduate students enrolled in 5 classes, coming from 10 provinces. The staff included 11 Chinese and 13 American and European teachers. Of the 23 graduates of this school, 11 are connected with medical schools, 8 are in mission hospitals, 1 in a private hospital, 1 in private practice, 1 is engaged in health education, and 1 is studying abroad. In spite of the financial embarrassment of the provincial administra-

tion the college received its regular annual subsidy of Mex. $30,000 (about $15,000 United States currency) from the government, but the grant of Mex. $20,000 for the hospital remained unpaid. The combined expenditure for the medical school and hospital amounted to Mex. $204,533.

II. PREMEDICAL EDUCATION

Recent Improvements in Laboratories

Marked progress was made in the field of premedical education during the year 1923, particularly in the provision of better laboratories and equipment for the teaching of physics, chemistry, and biology in colleges of arts and science. There are now several institutions in China which are as well equipped in this respect as many small colleges of good standing in the United States.

St. John's University at Shanghai formally opened its new laboratory building in June, 1923. This is a fire-proof building of brick and reinforced concrete with one floor for chemistry, one for physics, and one for biology. The China Medical Board contributed $60,000 towards the erection and equipping of this building.

Ginling College at Nanking, one of the best institutions in China for women, occupied in the fall of 1923 a group of fine new buildings, including a fire-proof science hall. The China Medical Board had previously contributed $5,000 towards laboratory equipment for this

institution, but the building was erected with funds received entirely from other sources.

Nankai College, a Chinese private institution at Tientsin, had the shell of its new brick and reinforced concrete laboratory building completed by the end of the year and planned to have it ready for use by the opening of the fall term of 1924. The total cost of this building and its equipment was to be Mex. $250,000 of which one half was contributed by a Chinese friend of the institution and the remainder by the China Medical Board.

Peking (Yenching) University began the erection of two laboratory buildings, one for chemistry and geology and the other for physics and biology. These buildings will be ready for use in the fall of 1925, when the University plans to move its work out of the city to this new site near the Summer Palace. One of these buildings is being erected and equipped with funds appropriated in 1922 by the China Medical Board.

The National Southeastern University at Nanking secured a pledge of Mex. $125,000 to match the appropriation made by the China Medical Board in 1922 for the construction and equipment of a laboratory building and plans were drawn so that actual work could be begun in the spring of 1924. This building is to house the departments of physics and chemistry. A

Fig. 63.—Shantung Christian University, chemistry building to the left, physics building to the right, administration building in the center, medical school buildings behind the wall in the background

Fig. 64.—Home for women nurses, Shantung Christian University

Fig. 65.—Women's dormitory for medical and premedical students, Shantung Christian University

similar building for the school of agriculture including the department of biology, is planned for the immediate future, to be constructed entirely with Chinese funds.

The Fukien Christian University at Foochow was about to begin work on its new science building towards which an appropriation was made by the Board in 1917, complications connected with the purchase of the site and other difficulties having delayed the work.

During the year 1923 the Board pledged $77,700 Hongkong currency for a science building for the Canton Christian College, on condition that an equal amount should be secured from other sources for the same purpose.

The College of Yale in China at Changsha has a small laboratory building of brick but not of fire-proof construction, which was completed in 1920, towards which the Board has contributed in all $41,164.75.

Apart from these institutions to which the Board has contributed, though in one case to a very small amount, a number of colleges have effected equally important improvements with funds secured entirely from other sources.

Shanghai College occupied a large fire-proof laboratory building erected in 1922, and costing with equipment Mex. $235,000. Soochow University has under construction an equally sub-

stantial and very well arranged science hall which is to cost Mex. $150,000, and should be ready for use in the fall of 1924. Tsing Hua College, the institution maintained near Peking by the Chinese Government with funds remitted from the American Boxer Indemnity, has had an excellent laboratory building since 1919. The Shantung Christian University at Tsinan has two large science halls erected in 1917 and 1919, affording more space than is enjoyed by any other similar institution, though not of fire-proof construction, and Nanking University has a building of similar type built in 1918, in which for the present the department of agriculture also is housed. Amoy University, a private institution, has just begun the construction of a chemical laboratory and is planning a building for biology to follow it.

While this list is not complete, most of the other institutions in China which have reasonably good laboratory accommodations are intended primarily for the teaching of engineering students and consequently give little or no attention to biology, so that they cannot be considered as satisfactory sources for the supply of medical students.

It is inevitable that at this stage considerable attention should be given to the provision of suitable physical equipment for the teaching of

the fundamental sciences. In earlier years contributions had been made towards the support of additional teachers, and towards the training of men for this service and it is proposed to continue this type of co-operation with a few selected institutions.

Visiting Professors

During the year Professor O. H. Smith of Cornell College, Iowa, completed his term of service as visiting professor of physics at the National Southeastern University, and Professor P. I. Wold of Union College, Schenectady, began a year's service as visiting professor of physics at Nankai College.

The Board continued for another year its contribution to the National Association for the Advancement of Education for the support of Professor George R. Twiss of Ohio State University, who has been making a survey of science teaching in colleges and middle schools and has been consulting with the teachers in regard to methods and equipment.

Summer Institute

A plan for a summer institute for science teachers to be held at Tsing Hua College in 1924 under the auspices of the National Association for the Advancement of Education, was approved by the Board and funds were appropri-

ated towards the expense of conducting the institute in that year.

Biological Supply Service

In view of the difficulty of securing and preparing suitable material for the teaching of biology at many places in China, preliminary arrangements were made for the establishment of a biological supply bureau, which would collect, prepare, and distribute material at cost to the colleges of China. This project involves the sending out of a naturalist for two years to initiate the service and to give the necessary training to persons already in China who would afterwards carry on the work independently.

III. FELLOWSHIPS

In accordance with the policy adopted by the Board last year, fellowships for study abroad are now granted, with rare exceptions, only to teachers in medical schools and schools of nursing and to teachers of the sciences in colleges or to persons in preparation for definite positions in such institutions.

The following table shows the number of persons studying under fellowships granted by the Board for study in America and Europe during 1923, with the subjects studied:

FELLOWSHIPS FOR STUDY IN UNITED STATES AND EUROPE

Subjects studied	*To Chinese*	*To Americans and Europeans*	*Total*
Medical:			
Anatomy	..	2	2
Bacteriology, immunology, and serology	1	..	1
Biochemistry	1	4	5
Dermatology and syphilology	1	..	1
Gynecology	..	2	2
Medicine	1	3	4
Medicine Tuberculosis	..	1	1
Neurology	1	1	2
Obstetrics	..	3	3
Ophthalmology	2	7	9
Oral surgery and dentistry	1	1	2
Orthopedic surgery	..	1	1
Pathology	1	3	4
Pediatrics	..	2	2
Pharmacology	1	1	2
Physiology	1	1	2
Public Health	..	1	1
Roentgenology	..	2	2
Surgery	..	10	10
	11	45	56

Subjects studied	*To Chinese*	*To Americans and Europeans*	*Total*
Premedical:			
Biology...........	..	2	2
Chemistry.........	2	3	5
Physics...........	2	3	5
	4	8	12
Miscellaneous:			
Dietetics..........	1	..	1
Hospital administration..............	1	..	1
Medical Photography	1	..	1
Nursing...........	1	4	5
	4	4	8
GRAND TOTAL	19	57	76
Deductions for persons counted more than once.............	1	19	20
	18	38	56

The total expenditure for fellowships for study in America and Europe, including in some cases traveling expenses and tuition, in 1923 was $25,141.44.

The relatively large number of Americans and Europeans holding these fellowships is explained by the fact that most of the teachers in the better medical schools in China are still foreigners. The new appointments made during the year, thirty-four in all, were divided equally among Chinese and foreigners. It is generally believed that recent graduates should ordinarily carry their training as far as possible in China before going abroad for more advanced study in their chosen fields. To encourage this practice a comparatively large number of fellowships are

provided for study at the Peking Union Medical College, which are open to persons already engaged in institutional work or preparing for such work. Some of these are held by doctors taking short graduate courses, while others are awarded to students who remain for periods varying from three months to a year or more working in the clinics and laboratories under the supervision of the staff. A few of these graduate students find it to their advantage to enroll in one or more regular undergraduate courses before attempting advanced work.

The following table shows the number of graduate and special students holding fellowships at Peking during the calendar year 1923, with the subjects studied:

FELLOWSHIPS FOR STUDY AT PEKING UNION MEDICAL COLLEGE

Subjects studied	*To Chinese*	*To Americans and Europeans*	*Total*
Medical:			
Anatomy	2	..	2
Bacteriology	2	..	2
Biochemistry	1	1	2
Hygiene (school)	2	2	4
Medicine	7	9	16
Medicine (clinical lab. technique)	3	..	3
Neurology	..	1	1
Obstetrics and gynecology	..	5	5
Ophthalmology	7	1	8
Parasitology	2	2	4
Pathology	1	..	1
Pediatrics	1	1	2
Pharmacology	..	1	1
Roentgenology	..	1	1
Surgery	5	12	17
	33	36	69

Subjects studied	*To Chinese*	*To Americans and Europeans*	*Total*
Premedical:			
Biology............	1	..	1
Miscellaneous:			
Dietetics...........	..	1	1
Hospital administration..............	..	1	1
Nursing............	6	1	7
Social Service.......	1	..	1
	8	3	11
GRAND TOTAL	41	39	80
Deduction for persons counted twice.......	..	1	1
	41	38	79

The total expenditure for fellowships at the Peking Union Medical College in 1923 was $8,051.88. This sum includes some payments for traveling expenses and tuition.

IV. MISCELLANEOUS

Aid to Hospitals

No important appropriations for mission hospitals or other hospitals not connected with medical schools were made in 1923, though some appropriations of previous years were altered in order to meet new conditions.

In view, however, of the need for the development of X-ray work in China, a total sum of $6,700 was appropriated to be used towards the cost of installation of simple equipment in seven institutions, including the Chinese Central Hospital at Peking, and the hospital of the National Medical College in the same city. The contributions of the China Medical Board in this case amounted to considerably less than one third of the total cost of equipment and installation. The provision of such modern equipment has naturally made it easier for hospitals to appeal effectively to their local communities for increased support.

Among the hospitals which the Board has aided several are receiving annually generous contributions from Chinese sources. The American Episcopal hospital at Anking received in

1923, Mex. $5,205; the Canton Hospital, Canton, Hongkong $5,400; the American Presbyterian Hospital at Changteh, Hunan, Mex. $1,000; the United Free Church Hospital at Mukden, Mex. $4,500; the American Presbyterian Hospital at Paotingfu, Mex. $13,850 in the year 1922–1923; the American Methodist Hospital at Peking, Mex. $1,088 in 1922–1923; the Church of the Brethren Hospital at Pingtingchow, Shansi, Mex. $1,300; the American Baptist Hospital at Shaohsing, Mex. $1,200; the Southern Methodist Hospital at Soochow, Mex. $4,000; the American Methodist Hospital at Wuhu, Mex. $15,200; and the Southern Baptist Hospital at Yangchow, Mex. $1,000 in 1922–1923. The total of such contributions reported by 15 hospitals, including some smaller gifts, was equivalent to about $30,000 United States currency, and this represents but a small fraction of the total number of mission hospitals in China, many others of which undoubtedly received similar gifts. The American Baptist Hospital at Ningpo had nearly Mex. $100,000 pledged by its Chinese friends for a new building project.

Gratifying as is this evidence of appreciation in certain communities of what foreign institutions are trying to do, a still more satisfactory development has been in the establishment of improved hospitals by the Chinese themselves.

Fig. 66.—A dormitory at the Canton Christian College given by Chinese residents of Java, an illustration of the substantial contribution which the Chinese have made to that institution

Fig. 67.—Physics laboratory, College of Yale in China

Fig. 68.—Science building, Shanghai College

Fig. 69.—Nursery, department of obstetrics, Peking Union Medical College

Reference has been made in the reports of previous years to the Central Hospital at Peking and the Chinese Red Cross General Hospital at Shanghai. In 1923 there was under construction in Mukden a Chinese government hospital of 450 beds which was to cost about Mex. $600,000 when fully equipped.

Popular Educational Campaign

In spite of these encouraging evidences of progress, hospitals in China still labor under a disadvantage in that the people at large have even less understanding than have Western communities of the nature and methods of modern medical science. They fail in particular to appreciate the need for dealing with disease as promptly as possible. Distrust of a strange foreign institution leads many to go to it only as a last resort. Consequently both the patients and the hospitals are subject to great expense for protracted treatment of many conditions which might have responded quickly to treatment in the early stages.

The reasons for the high cost of equipping and maintaining a good hospital, to say nothing of a medical school, are also not understood, and this fact makes it difficult in many places to raise funds either for improvements or for current expenses. Another result of the inadequate ap-

preciation of modern medicine is that too few of the best students are looking forward to medicine as a career.

In order to create a more favorable environment for the enterprises in which the Board is directly interested, particularly in the field of medical education, it has seemed desirable to give some help to the movement for popular health education which is being conducted in China by the Council on Health Education, a co-operative organization in which the National Medical Association, the China Medical Missionary Association, and other societies are represented. An appropriation of Mex. $13,500 a year for two years was accordingly made to the Council in 1923 for its general work, together with a special grant of Mex. $4,500 a year for five years for a special campaign among students in middle schools and colleges to interest them in medicine as a profession. The Council is now laying special emphasis on school hygiene and child welfare, but it conducts also an extensive press service and prepares and distributes illustrative material such as slides, films, charts, and models for use in lectures on public health. Sales and rentals of such material brought in 1923 the equivalent of over $5,000 United States currency. There is already a considerable demand for this material. The total budget of the Council for

all purposes for the year ending December 31, 1924, amounts to Mex. $70,070.

Translation and Terminology

The Board has been contributing since 1916 to the Publication Committee of the China Medical Missionary Association for its work in Chinese medical terminology and in translation of medical literature. The work in terminology has now been placed on a firm basis since the Ministry of Education and numerous Chinese colleges and scientific societies have joined in it. Provisional lists of terms for several of the medical sciences have been agreed on and the work is being carried further year by year. Chinese publishing houses are also becoming more interested in the publication of medical textbooks, and it seems likely that the best results may be obtained in the future by encouraging them to undertake both the translation and the publication of such books. In order to give the committee time to make such modification of its plans as might be necessitated by the termination of the grant of the China Medical Board, appropriations amounting to Mex. $18,000 were made to it, payments being spread over a period of three years on a diminishing scale.

Architectural Bureau

During the construction of the buildings of the Peking Union Medical College the architects

employed by the Board were frequently called upon for advice on the planning and construction of hospitals and laboratories. As this has seemed a very useful type of service, particularly at this time when so much new building is being done, provision was made in 1923 to maintain at Peking for three years an architectural bureau which would give consulting service to medical schools and hospitals and to colleges planning the construction or improvement of laboratories for physics, chemistry, and biology.

The Board and Officers

At the meeting of the Rockefeller Foundation held February 21, 1923, Dr. William H. Welch and Mr. John D. Rockefeller, Jr., were elected as members of the Board to serve until the annual meeting of the Foundation in 1926.

No changes were made in the officers of the Board during 1923. Mr. N. Gist Gee, the Board's adviser on premedical education, visited the United States during the spring and summer to familiarize himself with recent improvements in teaching methods, laboratory planning and equipment. The Director spent three months in North China and the Yangtze valley, returning to the United States in December.

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DIVISION OF MEDICAL EDUCATION

Report of the Director

To the President of the Rockefeller Foundation:

Sir:

I have the honor to submit herewith my report as Director of the Division of Medical Education for the period January 1, 1923, to December 31, 1923.

Respectfully yours,
RICHARD M. PEARCE,
Director

DIVISION OF MEDICAL EDUCATION

The Division of Medical Education of the Rockefeller Foundation is charged with the study and development of programs of assistance to medical education outside the United States and China.[1] Its activities have consisted in securing information upon the status of medical education in many countries, chiefly through the visits of officers of the Division; in collaborating with leaders in medical education in their study of problems; and in submitting for the consideration of the Foundation's trustees plans for the assistance of schools whose programs seem especially important to the progress of medicine throughout the world.

I. Surveys

During the year 1923 the following countries were visited by some representative of the Division, either for initial study of the status of medical education, or in connection with new programs then under consideration or subsequently

[1] In the United States this is one of the functions of the General Education Board; in China it is the work of the China Medical Board.

developed: Mexico, Colombia, England, Scotland, Wales, Netherlands, Rumania, Bulgaria, Yugoslavia, Turkey, Siam, and Straits Settlements.

In addition, in the development of programs already initiated, the following countries were revisited during the year: Austria, Belgium, Canada, China, Czechoslovakia, Germany, Hongkong, Hungary, and Poland.

Other work of the Division during 1923 may be classified under two headings: (1) new undertakings, and (2) progress of earlier undertakings.

Activities of the Division of Medical Education in 1923

1. Surveys and Counsel Given

Austria	England	Rumania
Belgium	Germany	Scotland
Bulgaria	Hongkong	Siam
Canada	Hungary	Straits Settlements
China	Mexico	Turkey
Colombia	Netherlands	Wales
Czechoslovakia	Poland	Yugoslavia

2. International Exchange of Information and Teaching Methods

a. Professors provided for
   - Brazil
   - Philippine Islands
   - Siam

b. Visits of teachers of medicine from
   - Hongkong
   - Japan

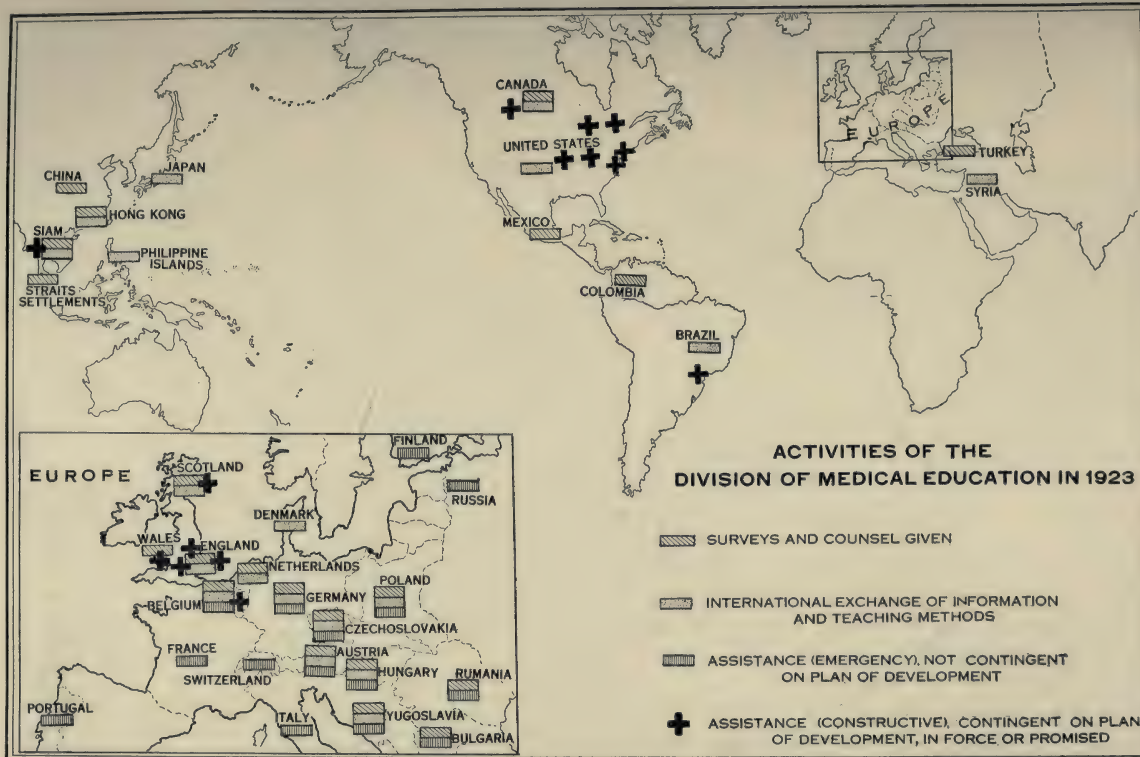

Fig. 70.—Activities of the Division of Medical Education

Fig. 71.—Royal procession at the opening of the new anatomy building of University College, London. A new anatomy building for the University College Hospital School, erected by funds provided by the Rockefeller Foundation, was formally opened on May 31, 1923, by His Majesty the King. A blue and gold canopy borne by students was carried over the King and Queen as they proceeded to the entrance of the new building

c. Visiting fellowships from

Austria	Hungary
Belgium	Japan
Brazil	Netherlands
Canada	Philippine Islands
Czechoslovakia	Poland
Denmark	Scotland
England	Syria
Germany	United States
Hongkong	Yugoslavia

3. Assistance (Emergency), Not Contingent on Plan of Development

a. Literature

Austria	Italy
Belgium	Poland
Bulgaria	Portugal
Czechoslovakia	Rumania
Finland	Russia
France	Switzerland
Germany	Yugoslavia
Hungary	

b. Laboratory supplies	c. Local fellowships[1]
Austria	Austria
Bulgaria	Bulgaria
Czechoslovakia	Czechoslovakia
Hungary	Germany
Poland	Hungary
Rumania	Poland
Yugoslavia	Rumania
	Yugoslavia

d. General

Pasteur Institute, Paris

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[1] Resident fellowships, not emergency in character, were also granted in connection with the Department of Pathology at São Paulo, Brazil, and also to United States citizens in co-operation with the General Education Board, through the Medical Fellowship Board of the National Research Council.

4. Assistance (Constructive), Contingent on a Plan of Development—in Force or Pledged

Chulalongkorn University, Bangkok, Siam—medical school and premedical school
Faculdade de Medicina e Cirurgia, São Paulo, Brazil
University of Brussels, Belgium
University College and University College Hospital Medical School, London, England
Four other medical schools of Great Britain
University of Alberta, Edmonton, Canada
Université de Montréal, Montreal, Canada
University of Toronto, Toronto, Canada
Columbia University, New York [1]
University of Chicago, Illinois [1]
University of Iowa [1]
University of Pennsylvania [1]

II. New Undertakings

Co-operation in Great Britain

Offers of assistance in the form of buildings and endowment, amounting to £272,000 capital and £1,750 annually for a period of five years, were placed before the authorities of four of the leading medical schools of Great Britain. As this action was taken in December, 1923, and as these offers are contingent upon provision of financial support or co-operation on the part of the recipient institutions, definite account is postponed for the annual report for 1924.

The Medical Research Council of Great Britain, unusually well equipped for the selection

[1] Jointly with the General Education Board.

of promising men in medical sciences, has shown a desire to further the cause of international medicine by sending British students to the United States for study. Since the National Research Council in Washington, through its Medical Fellowship Board, can grant fellowships to American students for study in England, plans were developed and assistance given by the Division of Medical Education to facilitate an interchange of medical students between the two countries. It was provided that sums up to a total of $50,000 may be expended by the Medical Research Council for this purpose in a three-year period. Four fellows appointed by the Council in accordance with this provision began their studies in the United States during 1923. (For fellows from the United States studying abroad see page 287.)

Aid to Premedical Education in Siam

In the negotiations with the Siamese Government which led to the adoption of a program for the development of the medical school of Chulalongkorn University, improvement in premedical courses was agreed to be an essential feature of the plans. In 1923 arrangements were completed between the Government and the Rockefeller Foundation providing for co-operation over a period of five years in the development of

premedical education. Professorships in premedical subjects will be created by the Government at Chulalongkorn University and the Foundation will, for a limited period, pay part of the salaries of foreign incumbents of these professorships while future Siamese professors are being trained.

University of Pennsylvania Medical School Assisted

At the suggestion of the General Education Board, that one of the boards founded by Mr. Rockefeller which takes initiative in matters of medical education in the United States, the Foundation pledged to the Medical School of the University of Pennsylvania, the first medical school established in the United States, $250,000 toward a fund of $1,000,000 for building and equipping new quarters for the departments of anatomy and physiological chemistry.

III. Progress of Earlier Undertakings

Emergency Work in Europe

The economic and social difficulties experienced by many of the states of Europe have affected medical education seriously. Unfavorable exchange has cut institutions off from foreign literature and laboratory materials. Lack of economic security among teachers and students has discouraged research and long periods

of study. The future of some schools has been imperiled by the uncertainty of governmental support, and intense nationalistic prejudices have rapidly affected the influence and importance of certain centers of medical education. In such a situation no aid that was not frankly of an emergency character could be wisely offered.

Medical Literature and Laboratory Supplies. During the past year the Division of Medical Education furnished medical literature, both books and journals, to medical schools in fifteen countries of Europe handicapped by low exchange. About three hundred medical libraries were supplied with literature, chiefly in the English language, though subscriptions to publications in European languages were added during the year. Over $20,000 was expended for this purpose. Great appreciation of this service has been expressed, and in many cases literature so supplied has been the only point of contact which the medical profession of certain communities has had with the outside medical world. The service is to be continued for 1924. Laboratory equipment, including animals and the cost of their maintenance, has been furnished to certain departments of medical schools in Austria, Bulgaria, Czechoslovakia, Hungary, Poland, Rumania, and Yugoslavia.

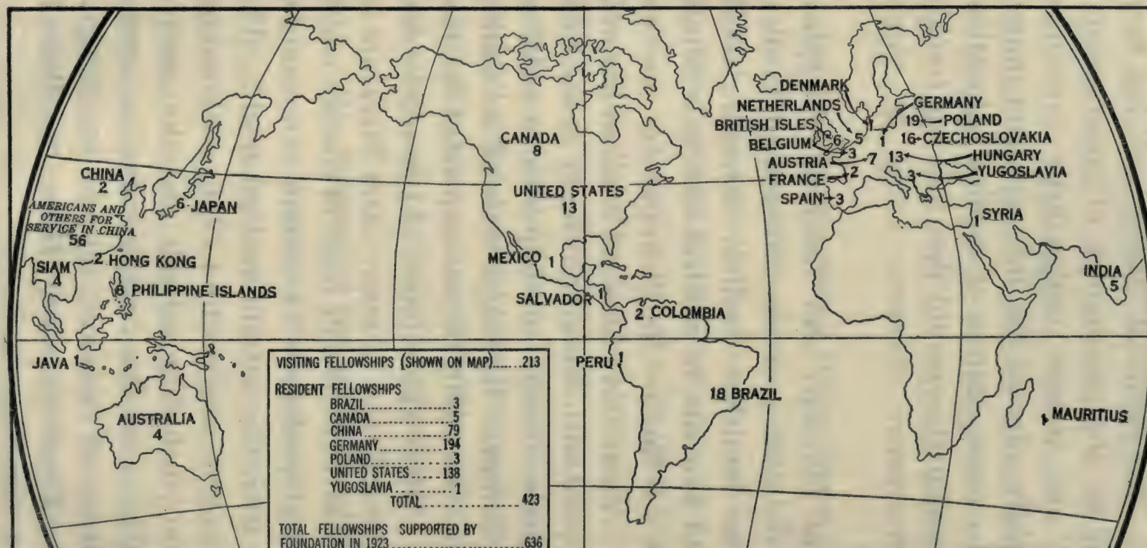

Fig. 72.—Fellowships for twenty-nine countries. Fellowships for which funds were provided by the Rockefeller Foundation were held in 1923 by 636 individuals from 29 countries. The 213 visiting fellows studied in 13 different countries

Resident Fellowships. The system of resident fellowships authorized by the Foundation in 1922 for medical scientists in European countries which might be definitely shown to be in need of such aid, was put into operation in 1923 in Austria, Bulgaria, Czechoslovakia, Germany, Hungary, Poland, Rumania, and Yugoslavia.

Pasteur Institute. An appropriation of $20,000 was made to the Pasteur Institute of Paris for work during 1923. This appropriation completes the pledge made in March, 1921, toward the support of the Institute during an especially difficult period of its existence.

Fellowships

Forty-six fellowships in medicine were in force in 1923 under the Medical Fellowship Board of the National Research Council of Washington, toward the expenses of which over a five-year period the Division of Medical Education in co-operation with the General Education Board pledged assistance in 1922. The distribution of these fellows was as follows: anatomy 3, bacteriology 4, biochemistry 6, chemistry 1, laryngology 1, medicine 5, neuropathology 1, pathology 3, pediatrics 1, pharmacology 2, physiology 10, surgery 8, syphilology 1.

Assistance was also provided for the expenses of four visiting fellows in medical sciences se-

lected by the Medical Research Council of the British Government for study in the United States (see page 283). The subjects studied by these fellows were: electrocardiography, neurological surgery, psychiatry, tuberculosis.

The Division of Medical Education directly maintained and administered during the year forty-five fellowships for graduates in medicine who are assured teaching positions in their own countries upon the conclusion of their studies. In allotting these grants preference was given to men from institutions with which the Division has programs of co-operation. The following countries were represented in this group of fellowships: Austria 4, Belgium 1, Brazil 6, Canada 3, Czechoslovakia 3, Denmark 1, Germany 1, Hongkong 2, Hungary 6, Japan 4, Netherlands 2, Philippines 2, Poland 5, Scotland 1, Syria 1, Yugoslavia 3. Of these fellows, six studied in England, four in Germany, three in France, one each in Denmark, the Netherlands, and Scotland, and thirty in the United States. One studied in both Germany and France. The distribution according to subjects of study was as follows: anatomy 1, bacteriology and immunology 1, dermatology and phototherapy 1, histology 3, hospital administration 1,[1] medicine 8, obstetrics

[1] This fellowship, allotted in connection with University of Brussels developments, was a special grant of the Division of Medical Education. In the future fellowships in this field will fall under the control of the Foundation's new Division of Studies.

Fig. 73.—Laying of the cornerstone of a new building for the University College Hospital, London, by His Majesty King George V. On the cornerstone in this picture is the inscription: "University College Hospital. This stone of the new obstetric hospital and residents' quarters, built by the generosity of the Rockefeller Foundation, U.S.A., was laid by His Majesty King George V, May 31, 1923." On the same day on the opposite side of the street Her Majesty Queen Mary laid the cornerstone of a new nurses' home which is a part of the general plan for the development of this medical center in London

Fig. 74.—New anatomy building, University College, London

Fig. 75.—Pathological laboratory, Royal Medical College, Bangkok

and gynecology 4, orthopedic surgery 1, parasitology 1, pathology 9, pediatrics 1, pharmacology 2, physiology and physiological chemistry 12.

In addition to the above-mentioned traveling fellowships, the Division provided resident fellowships for two Brazilians who studied in the Department of Pathology of the medical school at São Paulo.

Visiting Teachers of Medicine Entertained

On the invitation of the Foundation, the Japanese Government selected a commission of six members to visit the United States for the study of medical education and public health administration. The commission was composed of Dr. Kinnosuke Miura, internist; Dr. Keinosuke Miyairi, parasitologist; Dr. Akira Fujinami, pathologist; Dr. Mataro Nagayo, pathologist; Dr. Sahachiro Hata, bacteriologist; and Dr. Yoshihiro Takaki, surgeon. The Commission arrived March 12 and made an extended tour of many important educational and public health centers; a total of twenty-one schools were visited by the various members of the delegation. The visit has resulted in an improved understanding of the condition of medical science in America by the Japanese and a heightened esteem on the part of American scientists for

the status of medical science in Japan, so well represented by the Commission.

Professors of surgery and medicine at the University of Hongkong, occupying chairs endowed by the Foundation in 1922, were afforded an opportunity to visit some of the medical schools in Canada and the United States.

Medical School of Chulalongkorn University
Bangkok, Siam

In accordance with the agreement between the Foundation and the Government of Siam, the Siamese authorities appointed as Director of Studies and Professor of Pathology in the reorganized medical school of Chulalongkorn University (Royal Medical College) at Bangkok, Dr. A. G. Ellis, formerly of Jefferson Medical College, Philadelphia. The Foundation is planning to co-operate with the Siamese in securing the services of five other foreign professors who will, over a short period of years while Siamese personnel is being trained, organize and initiate medical teaching in the school. During the year negotiations by the Foundation in close co-operation with the Siamese authorities were in progress for the selection and appointment of heads of departments. A pathological laboratory and one hospital ward were completed during the year, and plans were in preparation for

additional wards and for buildings to house the departments of anatomy and physiology and the administrative offices.

Medical School of the University of the Philippines

Dr. William S. Carter, who under an agreement between the medical school of the University of the Philippines and the Division of Medical Education has been acting as associate dean of the school and as professor of physiology, continued his work during the year 1923, devoting attention especially to the development of the department of physiology. Dr. Carter's services in this capacity are expected to terminate in March, 1924.

Faculdade de Medicina e Cirurgia, São Paulo, Brazil

During 1923 assistance to the Department of pathology of the medical school of São Paulo included securing the services of a visiting professor, maintaining resident and traveling fellowships, and supplementing certain equipment and literature. Dr. Oskar Klotz terminated his contract as Professor of Pathology and was succeeded in March by Dr. Robert A. Lambert. During the year one whole-time assistant and two part-time assistants served in the department, a library of pathology was established, the

general laboratory service was improved, and research in pathology developed.

Canadian Medical Schools

During 1923 the program of assistance to Canadian medical schools adopted in 1920 was continued.

For the academic years 1920–1921, 1921–1922, 1922–1923, annual grants of $25,000 were made to the University of Alberta. Payment at the same rate continued to the end of 1923, when a capital sum of $500,000 was paid to the University for endowment of its medical school.

The University of Toronto during 1923 received interest on the sum of $1,000,000 pledged for endowment of its medical department. At the close of the year the total grant was paid to the institution.

The Université de Montréal was granted an appropriation of $25,000 for the development of laboratories in the premedical and medical departments during the academic year 1923–1924. This grant was in continuation of similar appropriations made for the academic years 1920–1921, 1921–1922, 1922–1923.

Payment of pledges to McGill University, Dalhousie University, and the University of Manitoba for their medical schools was completed prior to 1923. Co-operation with the

Fig. 76.—Commission of Japanese medical scientists arriving in the United States as guests of the Foundation

Fig. 77.—Studying medical education around the world. The associate director of the Foundation's Division of Medical Education was able by traveling in an aeroplane to save four weeks' time on a visit of inspection to the national medical school of Colombia

Fig. 78.—The new pathology building, McGill University. Directly across the street is the Royal Victoria Hospital

Fig. 79.—New laboratory for the medical sciences—biology, physiology, physiological chemistry, and pharmacology—McGill University

latter two universities during 1923 was limited to the provision of fellowships.

University College and University College Hospital Medical School, London

The new Institute of Anatomy at University College was completed and dedicated, and the foundation stones of the Obstetric Hospital and Nurses' Home were laid by Their Majesties the King and Queen, on May 31, 1923.

The final payments of £40,000 to the University College for building and equipment and of £100,000 to the University College Hospital Medical School were made. These sums are distinct from payments for endowment completed in 1922.

Free University of Brussels

The University of Brussels made progress in obtaining subscriptions for its share in the proposed development of the medical school. Actual work on the new buildings of the school has been delayed by uncertain economic conditions and high building costs, but a new hospital at Jette, affiliated with the medical school, has been completed and put into use. A director selected by the Brussels authorities for the hospital which is to be built by the City as a part of the medical school plant, has begun studies of hospital ad-

ministration under a fellowship of the Rockefeller Foundation.

United States Medical Schools

The following actions, originally proposed to the Foundation by the General Education Board in pursuance of the plan for the co-operation of these two organizations within the United States, were taken during the year. The sum of $1,000,000 toward endowment of the medical school of the University of Chicago was appropriated at the request of the University, in fulfilment of a pledge made in 1916. In accordance with a pledge made in 1921, a similar sum was granted to Columbia University for the erection and equipment of laboratories for the College of Physicians and Surgeons. Payment was made to the University of Iowa of the first of a series of five appropriations of $225,000 each, pledged in 1922 for the development of the medical school of the University.

Medical Information Service

Progress was made during the year in the preparation of a carefully revised list of medical schools of the world. For the information of deans and professors in these institutions bulletins are under preparation which will contain descriptions of teaching facilities and methods in various schools.

THE ROCKEFELLER FOUNDATION

Report of the Treasurer

New York, December 31, 1923

To the President of the Rockefeller Foundation:

Sir:

I have the honor to submit herewith my report of the financial operations of The Rockefeller Foundation and its subsidiary organizations for the period January 1, 1923, to December 31, 1923.

Respectfully yours,

L. G. MYERS,

Treasurer.

TREASURER'S REPORT

The following table summarizes the situation with respect to income, disbursements, and appropriations:

Undisbursed income on hand January 1, 1923, amounted to	$6,290,862.08
A contribution for hookworm study, received from Mr. George White, amounted to	45.00
Refunds on account of payments in 1922 and prior years amounted to	21,792.62
Income from January 1, 1923, to December 31, 1923, amounted to	8,822,879.09
The total amount available for disbursement was therefore	$15,135,578.79
Disbursements on account of appropriations amounted to	8,431,075.20
Leaving a balance of undisbursed income on December 31, 1923, amounting to . . .	$6,704,503.59
Unpaid appropriations and commitments effective in 1923 and prior years amount to	5,602,183.01
Leaving a balance in income account available for appropriation amounting to	$1,102,320.58

Appropriations and pledges effective in 1924 and following years, amounting to $15,116,-600.71, as shown in the annexed balance sheet,

are not included in the foregoing summary but are regarded as charges against the income of the years in which they fall due.

In compliance with the terms of a resolution adopted at the meeting of the Board of Trustees held December 6, 1922, the Henry Sturgis Grew Memorial Fund, amounting to $25,000.00, with accrued income amounting to $6,382.52, and the Arthur Theodore Lyman Endowment, amounting to $5,500.00, with accrued income amounting to $1,197.14, were transferred to the Harvard Medical School of China.

Income invested in land, buildings, and equipment, almost wholly in China, was diminished by the net sum of $25,615.62, as shown in Exhibit N, on page 357, making a total to date of $8,863,816.64.

Since the close of the year the accounts of the Comptroller, the accounts of the Treasurer, and the securities owned by the Corporation have been examined by Messrs. Price, Waterhouse and Company, Accountants, who have rendered a report to the Chairman.

The financial condition and operations are set forth in the appended exhibits listed below:

Balance Sheet	Exhibit A
Statement of Receipts and Disbursements of Income	Exhibit B

EXHIBIT A

BALANCE SHEET, DECEMBER 31, 1923

ASSETS

I. Investments			
General Fund			
General Schedule (Exhibit O)		$164,812,198.23	
Secured demand loans		392,426.27	
			$165,204,624.50
Special Funds			
Securities (Exhibit P)		$77,000.00	
Cash		10,000.00	
			87,000.00
			$165,291,624.50
II. Land, Buildings, and Equipment (Exhibit N)			
In China		$8,828,657.49	
In New York		35,159.15	
			$8,863,816.64
III. Income Accounts			
Special Funds			
Cash on deposit in New York			$106.43
General Fund			
Cash on deposit in New York		$275,111.75	
Cash on deposit in London		1,180,277.98	
Cash on deposit in Brussels		149,102.81	
Cash on deposit in Czechoslovakia		369,145.23	
Secured demand loans		2,207,573.73	
Funds in hands of agents, to be accounted for, and sundry accounts receivable	$2,525,214.39		
Less accounts payable	1,922.30		
		2,523,292.09	
Total		$6,704,503.59	
Excess of appropriations and pledges over income available		14,014,280.13	
			20,718,783.72
			$20,718,890.15
Grand Total			$194,874,331.29

EXHIBIT A

BALANCE SHEET, DECEMBER 31, 1923

FUNDS AND OBLIGATIONS

I. FUNDS (Exhibit M)			
General Fund			$165,204,624.50
Special Funds			
Gifts of Laura S. Rockefeller		$50,000.00	
Gift of John D. Rockefeller		37,000.00	
			87,000.00
			$165,291,624.50
II. LAND, BUILDINGS, AND EQUIPMENT FUND (Exhibit N)			
Appropriations from income			$8,863,816.64
III. INCOME ACCOUNTS			
Special Funds (Exhibit B)			
Estate Laura S. Rockefeller Fund		$64.77	
Laura S. Rockefeller Fund		41.66	
			$106.43
General Fund (Exhibit K)			
Balance due on appropriations payable in 1923 and prior years		$5,602,183.01	
Appropriations and pledges effective in 1924 and following years:			
1924	$9,334,819.71		
1925	2,670,126.50		
1926	1,830,655.50		
1927	627,495.00		
1928	447,295.00		
1929	126,500.00		
1930	79,709.00		
		15,116,600.71	
			*20,718,783.72
			$20,718,890.15
GRAND TOTAL			$194,874,331.29

* The total of all unpaid appropriations and pledges is $14,014,280.13 in excess of the balance of general fund income amounting to $6,704,503.59, as shown on opposite page, but it will be noted that these obligations become effective over a term of years, thus permitting their satisfaction gradually as the income of the respective years is received.

EXHIBIT B

STATEMENT OF RECEIPTS AND DISBURSEMENTS OF INCOME

GENERAL FUND

Receipts

Balance, December 31, 1922			$6,290,862.08	
Contribution toward the cost of a study of hookworm disease			45.00	
Refunds of payments made in prior years				
International Health Board		$12,681.78		
China Medical Board		9,110.84		
			21,792.62	
				$6,312,699.70
Income for the year				8,822,879.09
				$15,135,578.79
Disbursements				
International Health Board (Exhibit I)				
Hookworm, county health work, malaria, and yellow fever		$704,688.06		
Tuberculosis in France		175,698.27		
Public health education and fellowships		441,997.91		
Miscellaneous		752,797.64		
Administration		257,329.12		
			$2,332,511.00	
China Medical Board (Exhibit J)				
Medical education				
Peking Union Medical College				
Buildings and equipment	$31,121.23			
Operation	980,985.47			
Unaffiliated medical schools	26,349.10			
		$1,038,455.80		

Premedical education	85,476.81		
Hospitals and premedical education	28,763.44		
Hospitals—Mission and Chinese	78,520.56		
Translation of medical and nursing textbooks	8,462.35		
Fellowships and scholarships	32,057.12		
Miscellaneous	13,811.50		
Administration	69,394.97		
		1,354,942.55	
MEDICAL EDUCATION (Exhibit C)		3,556,025.02	
SCHOOLS OF HYGIENE AND PUBLIC HEALTH (Exhibit D)		618,750.00	
BIOLOGY, PHYSICS, AND CHEMISTRY (Exhibit E)		117,427.47	
HOSPITAL, DISPENSARY, AND NURSING STUDIES AND DEMONSTRATIONS (Exhibit F)		161,504.60	
MENTAL HYGIENE (Exhibit G)		52,152.70	
MISCELLANEOUS (Exhibit H)		50,825.40	
ADMINISTRATION (Exhibit H)		186,936.46	
			8,431,075.20
Income on hand December 31, 1923 accounted for in balance sheet			$6,704,503.59

SPECIAL FUNDS

LAURA S. ROCKEFELLER FUNDS

Income collected during the year ending December 31, 1923	$3,041.66
Amounts paid to the several organizations designated by Mrs. Rockefeller	3,000.00
Balance, December 31, 1923, accounted for in cash on deposit	$41.66

JOHN D. ROCKEFELLER FUND

Income collected during the year ending December 31, 1923	$1,850.00
Amounts paid to the organization designated by Mr. Rockefeller	1,850.00

EXHIBIT B—*Continued*

SPECIAL FUNDS—*Continued*

ESTATE LAURA S. ROCKEFELLER FUND

Balance of income December 31, 1923, accounted for in cash on deposit	$64.77

HENRY STURGIS GREW MEMORIAL FUND

Balance December 31, 1922	$5,665.54
Income collected during the year ending December 31, 1923	716.98
Total fund relinquished to Harvard Medical School of China, in accordance with a resolution of the Board adopted at its meeting of December 6, 1922	$6,382.52

ARTHUR THEODORE LYMAN ENDOWMENT

Balance December 31, 1922	$1,041.34
Income collected during the year ending December 31, 1923	155.80
Total fund relinquished to Harvard Medical School of China, in accordance with a resolution of the Board adopted at its meeting of December 6, 1922	$1,197.14

1923 FOUNDATION APPROPRIATIONS

BALANCES OF APPROPRIATIONS MADE IN PRIOR YEARS AND PAYMENTS THEREON MADE IN 1923

EXHIBIT C
MEDICAL EDUCATION

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
Belgium			
University of Brussels. Toward building and equipment of the new university institutes, Francs 6,700,000 (R.F. 2668)	$500,000.00	$.......	$........
Brazil			
Oswaldo Cruz Institute, Rio de Janeiro. For extending its work in pathology (R.F. 2642)	1,433.77	....	....
Faculdade de Medicina e Cirurgia, São Paulo. For scientific equipment and assistants for Department of Pathology (R.F. 2650, 2711)	2,983.80	5,000.00	7,605.10
To supplement salary of professor of pathology, 1921 and 1922 (R.F. 2589, 2709)	686.05	15,000.00	9,892.16
Study of medical education in Brazil, 1922 (R.F. 2630)	50.00	....	50.00
Canada			
University of Alberta			
Development of work in clinical branches (R. F. 2655, 2734)	12,500.00	25,000.00	23,544.53
Endowment of its medical school (R.F. 2757)	....	500,000.00	500,000.00
Université de Montréal, Faculty of Medicine. Development of laboratories (R.F. 2656, 2735)	12,500.00	25,000.00	25,000.00
University of Toronto			
Current expenses of its department of medicine (R.F. 2657, 2733)	25,000.00	50,000.00	48,047.96
Endowment of its medical department (R.F. 2758)	....	1,000,000.00	1,000,000.00

*The figures in parentheses, following the text describing the purpose of each appropriation, are the serial numbers of the resolution of the Board or Executive Committee, authorizing the payment.

EXHIBIT C—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
Central and Eastern Europe			
Co-operation with medical schools in the rehabilitation of their scientific equipment for teaching and research (R.F. 2495, 2581)	$67,389.84	$........	$41,519.62
Emergency assistance to laboratories for medical teaching (R.F. 2678, 2725)	....	100,000.00	4,365.26
England			
University College			
Toward building and equipment program £40,000 (R.F. 2722)	....	185,412.50	185,412.50
Interest on pledge of £180,000 for general endowment (R.F. 2599)	16,225.89	....	....
University College Hospital. Toward building and equipment program £100,000 (R.F. 2749)	....	460,000.00	436,059.00
Study of English methods of clinical instruction (R.F. 2631)	4,274.26	....	....
France			
Pasteur Institute. Toward its work during 1923 (R.F. 2677)	....	20,000.00	20,000.00
Expenses of visit to England and the United States of representatives of the University of Strasbourg (R.F. 2644)	1,323.16	....	192.12
Hongkong			
Expenses of visit to the United States of professors of the University of Hongkong (R.F. 2718, 2719)	....	3,000.00	1,724.19
Japan			
Expenses of visit to the United States of scientists from Japan (R.F. 2708, 2724)	....	18,000.00	16,182.86
Philippine Islands			
University of the Philippines. Salary and traveling expenses of associate dean of its medical school (R.F. 2633, 2665, 2680)	918.53	10,000.00	8,940.81

Siam			
Chulalongkorn University, Faculty of Medicine. Expenses of visiting pathologist (R.F. 2727)	....	5,000.00	4,090.49
United States			
Columbia University. Building and equipment of medical school laboratories (R.F. 2732)	....	1,000,000.00	8,333.33
New York Academy of Medicine. Salaries of educational director and librarian also clerical assistance and incidental expenses (R.F. 2714)	....	15,000.00	....
University of Chicago			
Endowment of its medical school (R.F. 2756)	....	1,000,000.00	1,000,000.00
Interest on pledge of $1,000,000 toward endowment of its medical school (R.F. 2731)	....	50,000.00	46,952.07
Miscellaneous			
American Medical Association. Toward loss in publishing a Spanish edition of its Journal (R.F. 2693, 2777, 2778)	....	25,000.00	5,585.54
Expenses of visit to the Peking Union Medical College of scientists from Japan (R.F. 2660)	298.08	....	271.99
Supplying the chief medical centers of Europe with important medical journals of America and England (R.F. 2649, 2679)	23,569.32	40,000.00	14,431.26
Survey of medical schools in Europe (R.F. 2651)	14,004.93	....	6,869.20
Expenses of study of American physiological institutions by Russian physiologist (R.F. 2742)	....	1,000.00	1,000.00
Expenses of visit to the United States of English scientist (R.F. 2726)	....	2,500.00	....
Fellowships			
Grants to doctors for medical study (R.F. 2681, 2682, 2683, 2712)	....	85,000.00	39,697.73
Fellowships and additional facilities for scientists of Austria, Czechoslovakia, Poland, Hungary, and Bulgaria (R.F. 2736)	....	35,000.00	....
Fellowships and additional facilities for scientists of Germany (R.F. 2707)	....	65,000.00	8,394.42
Medical Research Council, England. Fellowships in Medicine in the United States (R.F. 2730)	....	50,000.00	....

EXHIBIT C—*Continued*

		PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
Fellowships—*Continued*				
National Research Council. Research fellowships in medicine supported jointly by the Foundation and General Education Board (R.F. 2632, 2684)		$16,522.02	$50,000.00	$36,168.65
Administration—Division of Medical Education				
Home Office (R.F. 2703, 2739)		....	46,942.50	43,808.53
European Office (R.F. 2713, 2716)		....	19,016.25	11,885.70
TOTALS		$699,679.65	$4,905,871.25	$3,556,025.02
Unexpended balances of appropriations allowed to lapse—				
R.F. 2589	$418.61			
R.F. 2642	1,433.77			
R.F. 2599	16,225.89			
R.F. 2631	4,274.26			
R.F. 2632	13,903.42			
R.F. 2644	1,131.04			
R.F. 2660	26.09			
R.F. 2633	394.52			
R.F. 2665	159.28			
		37,966.88	....	....
R.F. 2681	$23,352.54			
R.F. 2682	13,035.54			
R.F. 2683	8,132.54			
R.F. 2693	4,414.46			
R.F. 2719	367.59			
R.F. 2726	2,500.00			
R.F. 2731	3,047.93			
R.F. 2733	26,952.04			
R.F. 2734	13,955.47			
R.F. 2739	3,133.97			
R.F. 2749	23,941.00			
			122,833.08	
NET TOTALS		$661,712.77	$4,783,038.17	$3,556,025.02

EXHIBIT D

SCHOOLS OF HYGIENE AND PUBLIC HEALTH

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
Harvard University—School of Public Health			
Buildings and equipment (R.F. 2578)	$500,000.00	$........	$500,000.00
Toward cost of operation (R.F. 2673)	....	25,000.00	18,750.00
General endowment (R.F. 2745)	....	100,000.00	100,000.00
TOTALS	$500,000.00	$125,000.00	$618,750.00

EXHIBIT E

BIOLOGY, PHYSICS, AND CHEMISTRY

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
National Research Council			
Research fellowships in physics and chemistry (R.F. 2691, 2608)	$25,497.74	$125,000.00	$83,557.53
Fellowships in the biological sciences (R.F. 2717)	....	20,000.00	13,869.94
Concilium Bibliographicum. Current expenses 1923 paid through the National Research Council (R.F. 2692)	....	20,000.00	20,000.00
TOTALS	$25,497.74	$165,000.00	$117,427.47
Unexpended balance of appropriation allowed to lapse (R.F. 2608)	18,423.67		
NET TOTALS	$7,074.07	$165,000.00	$117,427.47

EXHIBIT F

HOSPITAL, DISPENSARY, AND NURSING STUDIES AND DEMONSTRATIONS

		Prior Appropriations	1923 Appropriations	1923 Payments
American Conference on Hospital Service. Equipment and maintenance of the hospital library and service bureau (R.F. 2688, 2748)		$........	$15,000.00	$5,000.00
Committee for the Study of Public Health Nursing. Publication of report (R.F. 2667)		3,097.00	....	3,018.48
Committee on Dispensary Development. Toward expenses of Committee (R.F. 2597, 2689)		36,359.95	150,000.00	127,012.41
Study of nurse training in Europe (R.F. 2627, 2737)		5,756.43	17,000.00	6,336.72
L'Ecole de la Salpêtrière. Equipping of demonstration room (R.F. 2663)		1,000.00	....	187.90
Advanced Training of French Nurses. Training in English or American hospitals of French nurses who may return to France to carry on the supervision of training centers (R.F. 2628, 2687)		5,855.11	7,000.00	4,949.09
Yale University—School of Nursing				
Maintenance of educational features (R.F. 2720)		....	20,000.00	15,000.00
Equipment, supplies, and incidental expenses (R.F. 2721)		....	35,000.00	....
TOTALS		$52,068.49	$244,000.00	$161,504.60
Unexpended balances of appropriations allowed to lapse—				
R.F. 2597	$16,955.90			
R.F. 2627	4,296.93			
R.F. 2628	4,769.59			
R.F. 2663	812.10			
		26,834.52	....	....
NET TOTALS		$25,233.97	$244,000.00	$161,504.60

EXHIBIT G

MENTAL HYGIENE

		Prior Appropriations	1923 Appropriations	1923 Payments
National Committee for Mental Hygiene				
Survey of the care and treatment of mental deficiency (R.F. 2591)		$5,678.64	$........	$5,676.70
Surveys of the care and treatment of mental diseases (R.F. 2592, 2675)		566.32	40,000.00	33,227.25
Establishing uniform statistics on mental diseases (R.F. 2593, 2676)		1,115.96	3,000.00	3,248.75
Administration expenses (R.F. 2674)		....	10,000.00	10,000.00
Totals		$7,360.92	$53,000.00	$52,152.70
Unexpended balances of appropriations allowed to lapse—				
R.F. 2591	$1.94			
R.F. 2593	59.53			
		61.47		
Net Totals		$7,299.45	$53,000.00	$52,152.70

EXHIBIT H

MISCELLANEOUS

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
American Academy in Rome			
General purposes—$10,000 a year for ten years beginning 1914 (R.F. 215). Instalment for 1923	$........	$10,000.00	$10,000.00
Committee of Reference and Counsel of the Annual Foreign Missions Conference of North America			
For carrying out its program of co-operation and co-ordination in foreign missionary work of the principal American mission boards. Total pledge of $425,000 extending over a period of ten years beginning 1914 (R.F. 228). Instalment for 1923	....	25,000.00	12,500.00
National Health Council			
Toward budget for 1923 (R.F. 2690)	....	10,000.00	9,350.00
National Information Bureau			
Sustaining membership (R.F. 2715)	....	1,000.00	1,000.00
New York Association for Improving the Condition of the Poor			
Providing pensions for dependent widows with families—$20,000 a year for ten years beginning 1914 (R.F. 239)			
Balance of previous instalment	10,000.00	....	10,000.00
Instalment for 1923	....	20,000.00	5,000.00
Relief Work in Japan			
Through the Peking Union Medical College (R.F. 2743)	....	30,000.00	....
Expenses of Foundation's representatives (R.F. 2801)	....	700.00	....
Publications for persons engaged in public health and medical work (R.F. 2672)	....	200.00	43.14
Grand Chenier Wild Life Refuge			
Taxes and expenses (R.F. 2548)	3,232.12	....	....

EXHIBIT H—*Continued*

		PRIOR APPROPRIATIONS	1923 APPROPRIARIONS	1923 PAYMENTS
War Relief Commission				
Administration 1917 (R.F. 2216)		$644.75	$........	$........
		$13,876.87	$96,900.00	$47,893.14
Asset Accounts				
Furniture and fixtures (R.F. 2705)		$........	$4,000.00	$2,377.82
Books for the library (R.F. 2706)		....	700.00	554.44
TOTALS		$13,876.87	$101,600.00	$50,825.40
Unexpended balances of appropriations allowed to lapse—				
R.F. 2548		3,232.12		
R.F. 2690	$650.00			
R.F. 2705	1,622.18			
R.F. 2706	145.56			
			2,417.74	
NET TOTALS		$10,644.75	$99,182.26	$50,825.40
Administration				
Executive Offices (R.F. 2671, 2700, 2704, 2723, 2738)		$........	$149,945.00	$122,373.01
Treasurer's Office (R.F. 2614, 2701, 2702, 2729)		4,519.71	16,091.19	14,911.55
Retirement Allowances (R.F. 2740, 2741, 2794)		....	66,041.59	49,651.90
TOTALS		$4,519.71	$232,077.78	$186,936.46
Unexpended balances of appropriations allowed to lapse—				
R.F. 2614		1,366.51		
R.F. 2701	$53.12			
R.F. 2704	3,069.65			
R.F. 2723	14,469.96			
			17,592.73	
NET TOTALS		$3,153.20	$214,485.05	$186,936.46

EXHIBIT I

1923 INTERNATIONAL HEALTH BOARD APPROPRIATIONS,* BALANCES OF APPROPRIATIONS MADE IN PRIOR YEARS AND PAYMENTS THEREON MADE IN 1923

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
COUNTY HEALTH WORK			
United States			
Alabama			
1922 (I.H. 21276–85, 21636)	$11,647.48	$........	$10,724.11
1923 (I.H. 21637, 21879, 21939–42, 22061, 21684–96, 21796, 21852)	....	21,890.00	10,312.22
California			
1922 (I.H. 21650)	208.33	....	208.33
1923 (I.H. 21697–8, 21798, 22078)	....	7,083.33	3,333.33
Georgia			
1922 (I.H. 21286)	2,555.36	....	346.04
1923 (I.H. 21573)	....	1,600.00	366.62
Illinois			
1922 (I.H. 21495)	895.84	....	250.00
1923 (I.H. 21574, 21921)	....	2,266.66	1,239.99
Indiana			
1922 (I.H. 21416–18, 21482, 21484)	8,108.34	....	750.00
1923 (I.H. 21575, 21943, 22077)	....	2,250.00	2,250.00
Iowa			
1923 (I.H. 22109)	....	208.33	....

* The Foundation provides for the cost of work carried on by the International Health Board by making to the Board one or more appropriations to cover its work during the year. From these large grants the Board then makes its own appropriations for specific objects.

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
COUNTY HEALTH WORK—*Continued*			
United States—*Continued*			
Kansas			
1922 (I.H. 21287–93)	$5,881.05	$........	$2,014.33
1923 (I.H. 21816–22, 21651–57)	....	13,200.00	5,655.19
Kentucky			
1922 (I.H. 21377–83)	9,826.93	....	7,984.77
1923 (I.H. 21658–62, 21664, 21864)	....	17,166.48	12,315.98
Louisiana			
1922 (I.H. 21294–99)	5,207.03	....	3,739.89
1923 (I.H. 21787, 21880–84, 22119)	....	14,508.44	6,401.66
Maryland			
1922 (I.H. 21481, 21516)	4,007.38	....	3,635.56
1923 (I.H. 21582)	....	3,810.00	1,860.00
Minnesota			
1923 (I.H. 21799)	....	2,625.00	....
Mississippi			
1922 (I.H. 21300–06)	12,563.38	....	7,026.85
1923 (I.H. 21730–36)	....	17,500.00	9,928.41
Missouri			
1922 (I.H. 21307, 21394–96, 21419, 21428–9)	5,864.43	....	4,832.76
1923 (I.H. 21702, 21835–41)	....	10,650.00	7,243.69
New Mexico			
1922 (I.H. 21308–15, 21384–86, 21485, 21665)	7,433.19	....	4,696.09
1923 (I.H. 21753, 21755–57, 21800, 21855, 21866–68, 21885)	....	9,612.50	4,993.16

North Carolina			
1922 (I.H. 21420)	10,000.00	....	7,169.78
1923 (I.H. 21666)	....	9,650.00	6,514.07
Oregon			
1922 (I.H. 21535)	620.00	....	620.00
1923 (I.H. 21584–88, 21854)	....	10,833.33	1,663.83
South Carolina			
1922 (I.H. 21316–322)	6,744.28	....	5,546.46
1923 (I.H. 21708–10, 21712, 21801–3)	....	14,247.85	10,360.88
Tennessee			
1922 (I.H. 21323, 21535–40, 21326–28)	8,918.11	....	5,337.84
1923 (I.H. 21667–9, 21886, 21944–49)	....	11,900.00	8,005.94
Texas			
1922 (I.H. 21397–400)	8,421.41	....	6,968.72
1923 (I.H. 21589–92, 21907–15)	....	10,000.00	....
Virginia			
1922 (I.H. 21368–69, 21372, 21496–500, 21543)	4,520.00	....	3,109.43
1923 (I.H. 21737, 21739–43, 21922)	....	12,045.26	8,972.41
West Virginia			
1922 (I.H. 21443–47)	6,851.79	....	2,282.61
1923 (I.H. 21758–63, 21923)	....	11,500.00	4,554.26
Wyoming			
1923 (I.H. 22157)	....	416.67	....
Foreign Countries			
Brazil			
1922 (I.H. 21263, 21257, 21518–520)	16,621.80	....	8,621.13
1923 (I.H. 21593–96, 21598–9, 21851, 21601, 21920)	....	22,123.00	6,449.70
Canada, New Brunswick—Rural health program			
1923 (I.H. 21604)	....	27,000.00	5,718.24
Training Bases for Field Staff			
Mississippi			
1923 (I.H. 21699)	....	7,500.00	5,211.73

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
HOOKWORM WORK			
United States			
Alabama			
1923 (I.H. 21933)	$........	$45.00	$........
Central America			
Costa Rica			
1922 (I.H. 21247)	5,479.43	....	4,200.00
1923 (I.H. 21551)	....	6,100.00	3,889.63
Guatemala			
1922 (I.H. 21248)	12,289.95	....	2,213.93
1923 (I.H. 21552)	....	19,160.00	7,759.44
Honduras			
1922 (I.H. 21487)	6,086.37	....	2,578.01
1923 (I.H. 21553, 21919)	....	10,645.50	6,567.88
Nicaragua			
1922 (I.H. 21249)	2,219.43	....	1,029.08
1923 (I.H. 21554)	....	5,800.00	2,295.75
Panama			
1922 (I.H. 21250)	6,855.52	....	2,896.23
1923 (I.H. 21555, 21876)	....	27,575.00	5,478.80
South America			
Brazil			
1922 (I.H. 2975, 21251–52, 21254–56, 21258–62, 21264–65, 21479–80, 21496, 21521, 21634)	103,616.11	....	51,347.42
1923 (I.H. 21565–8, 21648, 21682–3, 21784)	....	99,270.00	38,206.40

Colombia			
1922 (I.H. 21366)	9,830.27	....	3,461.32
1923 (I.H. 21635, 21834)	....	12,590.00	8,287.55
Dutch Guiana			
1922 (I.H. 21269)	6,889.96	....	4,519.60
1923 (I.H. 21557)	....	13,000.00	10,063.96
West Indies			
Dominica (survey)			
1923 (I.H. 21556)	....	1,300.00	89.32
Jamaica			
1922 (I.H. 21270)	6,775.06	....	2,894.32
1923 (I.H. 21558–9)	....	30,900.00	8,863.50
Porto Rico			
1922 (I.H. 21271)	14,567.81	....	5,999.74
1923 (I.H. 21560, 21938)	....	25,292.00	10,978.15
St. Kitts—Nevis (survey)			
1923 (I.H. 21562)	....	1,500.00	82.76
St. Lucia			
1922 (I.H. 21272)	5,140.24	....	4,411.74
1923 (I.H. 21563)	....	9,100.00	4,299.90
Trinidad			
1922 (I.H. 21273)	7,529.26	....	4,656.17
1923 (I.H. 21564)	....	11,880.00	7,034.33
The East			
Australia			
1922 (I.H. 21274)	23,155.64	....	14,240.51
1923 (I.H. 21569, 22069)	....	18,360.00	13,733.51
British North Borneo			
1922 (I.H. 21367)	2,087.25	....	....

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
HOOKWORM WORK—*Continued*			
The East—*Continued*			
Egypt			
1915 (I.H. 237)	$4,641.88	$........	$........
Fiji			
1922 (I.H. 21405, 21452)	2,954.46	....	1,373.27
1923 (I.H. 21649)	....	2,300.00	1,209.85
India			
1923 (I.H. 21570, 21775, 21904)	....	16,500.00	....
Mauritius			
1922 (I.H. 21442, 21531)	7,348.04	....	2,154.99
1923 (I.H. 21571)	....	7,000.00	1,999.63
Siam			
1922 (I.H. 21275)	9,543.13	....	812.44
1923 (I.H. 21572, 21877)	....	15,788.00	9,211.95
Miscellaneous			
Field Studies			
Alabama			
1923 (I.H. 21794)	....	4,525.00	2,231.87
China			
1923 (I.H. 21752, 21795)	....	8,141.67	3,700.61
Ceylon			
1922 (I.H. 21508)	450.00	....	450.00
1923 (I.H. 21776)	....	240.00	10.91
Porto Rico			
1922 (I.H. 21464)	642.49	....	.75
Experiments with pigs	....	475.00	....
Research in carbon tetrachloride (I.H. 21832, 22065)	....	10,002.47	5,732.44

Resurveys in selected counties in the Southern States (I.H. 21409, 21850)	2,489.74	10,000.00	6,008.07
Portable house and office at Salvador (I.H. 2839)	75.00	....	26.50
Motion picture film on hookworm disease (I.H. 2947)	397.53	....	....
Study of various methods of diagnosis used in connection with hookworm disease (I.H. 21165)	241.43	....	....
MALARIA WORK			
Co-operative Demonstrations			
United States			
Alabama			
1922 (I.H. 21430, 21433, 21465, 21744)	5,155.63	....	3,411.52
1923 (I.H. 21765, 21855–57, 21893)	....	8,752.50	3,792.03
Arkansas			
1922 (I.H. 21411)	2,705.57	....	2,173.68
1923 (I.H. 21545)	....	5,000.00	....
Georgia			
1922 (I.H. 21432)	525.08	....	525.08
1923 (I.H. 21546, 21810, 21853)	....	4,400.00	661.98
Illinois			
1922 (I.H. 21494)	577.20	....	....
1923 (I.H. 21811, 21826)	....	3,166.66	1,006.84
Louisiana			
1923 (I.H. 21768, 21778–79, 21812–14)	....	6,548.99	2,598.05
Mississippi			
1922 (I.H. 21413, 21453–56, 21470, 21517, 21674)	6,365.73	....	5,342.20
1923 (I.H. 21745, 21780–82, 21858)	....	8,560.50	5,933.20
Missouri			
1922 (I.H. 21435–38, 21509, 21675)	4,750.00	....	2,700.00
1923 (I.H. 21717, 21842–3)	....	3,400.00	1,200.00
North Carolina			
1923 (I.H. 21769, 21788–90, 21845, 21929)	....	10,499.98	1,368.72

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
MALARIA WORK—*Continued*			
Co-operative Demonstrations—*Continued*			
United States—*Continued*			
South Carolina			
1922 (I.H. 21414, 21431, 21490–492, 21677)	$11,720.24	$........	$10,582.55
1923 (I.H. 21720–1, 21859–61, 22083)	....	9,370.00	....
Tennessee			
1922 (I.H. 21533–4)	314.00	....	298.17
1923 (I.H. 21951–53)	....	2,500.00	....
Texas			
1922 (I.H. 21460, 21472)	2,415.00	....	2,307.84
1923 (I.H. 21722, 21898–901)	....	7,450.00	1,748.50
Virginia			
1922 (I.H. 21415, 21441, 21457–59, 21471, 21489)	2,946.36	....	2,945.94
1923 (I.H. 21748, 21808, 21827–30)	....	9,820.00	6,864.10
Field Studies and Experiments			
United States			
Georgia			
1923 (I.H. 21809, 21844, 21927)	....	6,825.00	5,637.91
Louisiana			
1922 (I.H. 21510)	8,668.39	....	6,788.71
1923 (I.H. 21807)	....	325.00	205.17
Maryland			
1923 (I.H. 21894, 21928, 21950)	....	1,700.00	1,495.31
Mississippi			
1923 (I.H. 21785)	....	156.34	156.34

Johns Hopkins School of Hygiene			
1923 (I.H. 21825)	....	1,140.00	690.00
Central America			
Nicaragua			
1922 (I.H. 21358)	509.42	....	350.73
1923 (I.H. 21547, 21906)	....	1,100.00	699.06
South America			
Brazil			
1922 (I.H. 21488)	16,143.60	....	10,816.50
1923 (I.H. 21550, 21766–7)	....	31,265.00	12,241.16
West Indies			
Porto Rico			
1922 (I.H. 21365, 21440)	12,638.63	....	9,769.01
1923 (I.H. 21676)	....	4,550.00	3,134.22
Europe			
Italy			
1923 (I.H. 21824)	....	5,000.00	93.42
The East			
Palestine			
1922 (I.H. 21640)	559.50	....	104.02
1923 (I.H. 21746)	....	2,400.00	577.20
Philippine Islands			
1922 (I.H. 21389)	9,415.14	....	539.09
1923 (I.H. 21747)	....	10,000.00	2,055.19
Miscellaneous			
Conference of malaria workers (I.H. 21639, 21764)	383.97	130.00	405.82
Motion picture film on malaria (I.H. 21643)	....	6,000.00	5,766.31

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
YELLOW FEVER			
Brazil			
1922 (I.H. 21406)	$1,000.00	$........	$469.68
1923 (I.H. 21873, 22058)	....	150,000.00	16,634.58
Countries bordering on Caribbean Littoral and Amazon Valley			
1923 (I.H. 21793)	....	10,000.00	5,265.57
Colombia			
1923 (I.H. 21847, 21874)	....	30,000.00	6,335.62
Ecuador			
1922 (I.H. 21407)	1,358.66	....	367.36
Mexico and Central America			
1922 (I.H. 21402, 21450, 21530)	54,305.52	....	37,790.26
1923 (I.H. 21724, 21792, 21846)	....	120,000.00	56,782.19
Venezuela			
1923 (I.H. 21875)	....	10,000.00	....
West Africa			
1922 (I.H. 21392, 21791)	76.27	240.00	316.24
Training of personnel (I.H. 21751, 21934)	....	11,500.00	8,875.04
Vaccine and serum (I.H. 21541, 21726)	962.01	6,000.00	4,748.07
History of yellow fever (I.H. 21478, 21750)	367.81	10,000.00	6,481.45
TUBERCULOSIS IN FRANCE			
Central Administration			
1922 (I.H. 21329)	35,129.30	....	17,195.14

Comité National			
1923 (I.H. 21610, 21727)	....	34,700.00	17,329.01
Departmental Organization			
1922 (I.H. 21332)	16,568.57	....	12,612.84
Educational Division			
1922 (I.H. 21331)	70,490.44	....	31,547.99
Public Health Visiting			
1922 (I.H. 21330)	89,680.80	....	48,326.10
1923 (I.H. 21611)	....	103,570.00	43,122.83
Postgraduate Tuberculosis Courses			
1922 (I.H. 21333)	6,884.23	....	1,928.38
Contingent Fund			
1922 (I.H. 21334)	7,509.06	....	....
1923 (I.H. 21612)	....	7,500.00	3,635.98
PUBLIC HEALTH EDUCATION			
Schools of Hygiene and Public Health			
Brazil—Institute of Hygiene, São Paulo			
Operation (I.H. 21336, 21618, 21681)	5,873.66	12,100.00	9,970.83
Equipment and supplies (I.H. 21647, 22176)	1,748.95	3,000.00	1,748.95
Czechoslovakia—Institute of Public Health, Prague			
(I.H. 21680, 22174)	397,787.05	200,000.00	3,666.70
England—School of Hygiene, London			
Land, buildings, and equipment—(I.H. 21723)	237,225.22	....	209,023.55
Operation—1923 (I.H. 21749)	....	25,000.00	....
Poland—Institute of Hygiene, Warsaw			
Building and equipment (I.H. 21930)	212,500.00	....	25,000.00
Salary and expenses of biochemist (I.H. 21931)	....	3,000.00	2,200.00

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
PUBLIC HEALTH EDUCATION—*Continued*			
Study and Training Courses for Health Officers			
Michigan (I.H. 21638)	$600.00	$........	$571.12
Missouri (I.H. 21786)	....	95.04	95.04
Ohio			
Correspondence courses			
Health Officers (I.H. 21376, 21715, 21863)	416.46	1,500.00	1,891.39
Health Nurses (I.H. 21645–46, 21772)	337.50	1,400.00	1,074.47
Health Officers Institute (I.H. 21937)	....	500.00	235.93
Fellowships			
Grants to doctors for study of public health (I.H. 21619–21, 21848, 21862, 21916, 22059, 22086)	....	189,800.00	186,519.93
PUBLIC HEALTH ADMINISTRATION			
United States			
Aid in Developing State Health Services			
Sanitary Engineering			
Missouri			
1922 (I.H. 21501)	1,050.00	....	1,050.00
1923 (I.H. 21602)	....	450.00	368.43
Montana			
1923 (I.H. 21870)	....	950.00	....
Utah			
1922 (I.H. 21502)	805.00	....	636.33
1923 (I.H. 21603)	....	690.00	....
Epidemiology			
Virginia			
1923 (I.H. 21777)	....	2,625.00	1,180.38

Utah			
1923 (I.H. 22196)	....	267.50	....
Vital Statistics			
Georgia			
1923 (I.H. 21878)	....	400.00	....
Brazil—Toward development of a public health nursing service			
1922 (I.H. 21425, 21463)	6,149.09	....	4,879.19
1923 (I.H. 21605–6, 21903)	....	21,200.00	14,381.71
Czechoslovakia			
1922 (I.H. 21335)	4,896.39	....	1,444.76
1923 (I.H. 21607)	....	8,220.00	8,700.00
Philippine Islands			
1923 (I.H. 21729)	....	300.00	142.46
League of Nations			
Toward maintenance of an international interchange of public health personnel			
1922 (I.H. 21633)	15,020.00	....	....
1923 (I.H. 21525, 21609)	....	63,080.00	....
Toward development of an epidemiological intelligence service 1923 (I.H. 21608)	....	32,840.00	....
Toward cost of training health officers in vital and public health statistics			
1923 (I.H. 21871)	....	7,500.00	....
PUBLIC HEALTH LABORATORY SERVICE			
United States			
Alabama			
1922 (I.H. 21515)	3,600.00	....	3,261.03
1923 (I.H. 21613, 21770)	....	10,000.00	6,017.58
Arkansas 1923 (I.H. 22162)	....	2,000.00	....

EXHIBIT I—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
PUBLIC HEALTH LABORATORY SERVICE—*Continued*			
United States—*Continued*			
Kansas			
1922 (I.H. 21337)	1,347.02	....	1,315.16
1923 (I.H. 21673)	....	2,750.00	2,693.88
Missouri 1922 (I.H. 21426)	708.33	....	541.65
Montana 1923 (I.H. 21869)	....	1,050.00	....
Oregon 1923 (I.H. 21925, 22084)	....	900.00	150.00
Tennessee			
1922 (I.H. 21678)	250.00	....	250.00
1923 (I.H. 21716)	....	600.00	600.00
Virginia 1923 (I.H. 21806)	....	900.00	642.66
Central America			
British Honduras (I.H. 21614)	....	2,300.00	....
Costa Rica (I.H. 21672)	....	500.00	303.14
Guatemala (I.H. 21235, 21507, 21615)	1,669.74	3,050.00	1,654.14
Honduras (I.H. 21513, 21804)	3,000.00	1,500.00	686.17
Nicaragua (I.H. 21236, 21338, 21529, 21616, 21823)	4,423.36	3,500.00	2,767.67
Salvador (I.H. 21514, 21234, 21617, 21905)	586.94	4,500.00	3,207.63
Demonstrations (I.H. 21144, 21771)	206.33	300.00	206.33
ADMINISTRATIVE FIELD STAFF			
Salaries (I.H. 21340, 21622)	9,112.89	430,000.00	364,195.07
Traveling expenses (I.H. 21342, 21624)	19,912.35	150,000.00	93,381.12
Commutation (I.H. 21341, 21623)	17,643.92	60,000.00	38,659.27
Medical examinations (I.H. 21628)	....	1,500.00	775.00
Drugs for conserving health (I.H. 21627)	....	1,000.00	10.25

Bonding (I.H. 21626, 21936)	....	6,000.00	4,995.33
Automobiles (I.H. 21629)	....	3,000.00	1,504.80
Traveling expenses of families (I.H. 21343, 21625, 22180)	4,567.33	16,500.00	17,465.99
Retiring allowances (I.H. 22164)	....	214,000.00	166,326.31
MISCELLANEOUS			
Expenses in connection with the visit to England and the United States of French scientist (I.H. 21475)	931.63	....	45.25
Expenses in connection with the visit to England, Germany, and the United States of Polish scientist (I.H. 21642)	3,000.00	....	1,872.18
Expenses in connection with the visit to England, France, Germany, and the United States of Hungarian scientist (I.H. 21774)	....	3,000.00	1,145.61
Expenses in connection with the visit to the United States of Mexican scientist (I.H. 21932)	....	800.00	....
Express, freight, and exchange (I.H. 21631)	....	5,000.00	....
Field equipment and supplies (I.H. 21630, 21918)	....	7,000.00	6,688.08
Pamphlets and charts (I.H. 21632)	....	10,000.00	3,057.48
Shipment of smallpox vaccine to Verz Cruz, Mexico (I.H. 21831)	....	175.00	165.62
Plans for laboratory at Nictheroy, Brazil (I.H. 22064)	....	429.98	429.98
ADMINISTRATION			
Home Office (I.H. 21644, 21733, 21902)	....	219,124.00	201,901.23
Paris Office (I.H. 21728, 21783)	....	27,048.75	13,002.68
Retiring allowances (I.H. 22164)	....	50,000.00	42,425.21
TOTALS	$1,703,697.42	$3,085,991.73	$2,365,092.81
Appropriations for expenditures made in certain foreign countries are based on fixed rates of exchange. This amount represents the difference between the cost at the fixed rate and the actual cost of such exchange items	....	....	32,581.81

EXHIBIT I—*Continued*

		PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
Unexpended balances of appropriations allowed to lapse				
Prior Year		$390,511.69	$........	$........
1923	$162,232.88	....	....	....
Difference in exchange as above	32,581.81			
		....	194,814.69	....
NET TOTALS *		$1,313,185.73	$2,891,177.04	$2,332,511.00
Refunds on prior year appropriations				
Salvador—portable house for director (I.H. 2285)		$1,400.00		
Brazil, State of Bahia (I.H. 2975)		1,750.00		
British North Borneo (I.H. 21367)		226.60		
Egypt (I.H. 237)		9,305.18		
		$12,681.78		

* The Foundation appropriated to the International Health Board for its work during the year 1923 the sum of $2,944,045.00.

EXHIBIT J

1923 CHINA MEDICAL BOARD APPROPRIATIONS * AND BALANCES OF APPROPRIATIONS MADE IN PRIOR YEARS, AND PAYMENTS THEREON MADE IN 1923

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
HOSPITALS OF MISSIONARY SOCIETIES			
American Baptist Foreign Mission Society			
Ningpo—Support of additional staff (C.M. 276)			
Balance of previous instalments	$6,750.00	$........	$........
Instalment for 1923	....	2,250.00	....
Shaohsing			
Support of additional staff (C.M. 277)			
Balance of previous instalments	6,675.00	....	513.14
Instalment for 1923	....	2,475.00	....
Equipment and residences (C.M. 278, 2319)	5,625.00	....	2,625.00
American Board of Commissioners for Foreign Missions			
Fenchow			
Support of additional staff (C.M. 2519)			
Previous instalments	7,400.00	....	....
Instalment for 1923	....	3,700.00	....
Current expenses (C.M. 2520)			
Instalment for 1922—Mex. 2,500	1,500.00	....	1,287.50
Instalment for 1923—Mex. 2,500	....	1,500.00	....

* The Foundation provides for the cost of work carried on by the China Medical Board by making to the Board one or more appropriations to cover its work for the year. From these large grants the Board then makes its own appropriations for specific objects.

EXHIBIT J—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
HOSPITALS OF MISSIONARY SOCIETIES—*Continued*			
American Board of Commissioners for Foreign Missions—*Continued*			
Tehchow			
Support of additional staff (C.M. 211, 294, 297, 2229, 2360, 2498)			
Balance of previous instalments	$9,614.79	$........	$57.09
Instalment for 1923	....	1,091.00	....
Current expenses (C.M. 2571)			
Balance of previous instalments	2,310.50	....	1,450.70
Instalment for 1923	....	2,310.50	....
Board of Foreign Missions of the Methodist Episcopal Church			
Peking			
Support of additional staff (C.M. 2266, 2522)			
Balance of previous instalments	6,300.00	....	4,500.00
Instalment for 1923	....	6,150.00	....
Residences (C.M. 2523)	8,000.00	....	4,000.00
Initial equipment for dental department (C.M. 2540)	10,000.00	....	....
Wuhu			
Support of additional staff (C.M. 2385)			
Balance of previous instalments	10,299.33	....	....
Instalment for 1923	....	7,250.00	....
Building of hospital and residences (C.M. 2384, 2499)	70,000.00	....	12,000.00
Board of Missions of the Methodist Episcopal Church, South			
Soochow			
Support of additional staff (C.M. 2418)			
Balance of previous instalments	28,500.00	....	....
Instalment for 1923—Mex. 8,000	....	9,500.00	....
X-ray Equipment (C.M. 2619)	....	1,000.00	1,000.00

Board of Missions of the Methodist Episcopal Church, South—American Baptist Foreign Mission Society, Jointly			
Huchow—Support of additional staff (C.M. 2152, 2153, 2154)			
Instalment for 1922	1,725.00	....	1,725.00
Instalment for 1923	....	1,725.00	....
Board of Foreign Missions of the Presbyterian Church in the U. S. A.			
Changteh—Maintenance (C.M. 2144, 2604)			
Balance of previous instalments	450.00	....	....
Instalment for 1923	....	3,750.00	3,750.00
Chefoo			
Support of additional staff (C.M. 284) Balance of previous instalments	6,361.30	....	....
Maintenance (C.M. 2603) Instalment for 1923	....	3,750.00	3,750.00
Hwaiyuen—Support of additional staff and current expenses (C.M. 285)			
Balance of previous instalments	3,937.50	....	3,375.00
Instalment for 1923	....	3,375.00	....
Paotingfu			
Support of additional staff (C.M. 2306) Balance of previous instalments	225.00	....	....
Maintenance (C.M. 2572)			
Balance of previous instalment	2,250.00	....	....
Instalment for 1923	....	4,500.00	....
X-ray equipment (C.M. 2623)	....	500.00	500.00
Paotingfu, Shuntehfu. Support of additional staff (C.M. 214, 295). Balance of previous instalments	6,875.00	....	1,420.83
Shuntehfu—Maintenance (C.M. 2573)			
Balance of previous instalment	1,125.00	....	....
Instalment for 1923	....	2,000.00	....

EXHIBIT J—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
HOSPITALS OF MISSIONARY SOCIETIES—*Continued*			
Board of Foreign Missions of the Reformed Church in America			
Hope and Wilhelmina Hospital			
Equipment (C.M. 2282)	$2,025.00	$........	$........
Support of additional staff (C.M. 2283)			
Balance of previous instalments	5,643.00	....	....
Instalment for 1923	....	1,881.00	....
Canton Christian College, Canton—Current expenses (C.M. 2541).			
Balance of previous instalments	5,500.00	....	4,770.00
Church of Scotland Foreign Mission Committee, Ichang—Support of additional staff (C.M 289)			
Balance of previous instalments	5,250.00	....	750.00
Instalment for 1923	....	2,250.00	....
Domestic and Foreign Mission Society of the Protestant Episcopal Church in the U. S. A.			
Anking			
Support of additional staff (C.M. 2308)			
Balance of previous instalments	4,275.00	....	....
Instalment for 1923	....	4,200.00	1,500.00
X-ray equipment (C.M. 2622)	....	1,000.00	....

Executive Committee of Foreign Missions of the Presbyterian Church in the U. S., South			
Soochow, Kashing—Support of additional staff (C.M. 2101) Balance of previous instalments	13,625.00	....	....
Foreign Mission Board of the Southern Baptist Convention			
Laichowfu—Support of additional staff (C.M. 279, 280)			
Balance of previous instalments	5,700.00	....	....
Instalment for 1923	....	1,650.00	....
Hwanghien—Support of additional staff (C.M. 281, 282, 2103)			
Balance of previous instalments	4,950.00	....	....
Instalment for 1923	....	900.00	....
Yangchow			
Support of additional staff (C.M. 2104, 2106). Balance of previous instalments	4,875.00	....	....
Maintenance (C.M. 2525). Instalment for 1923—Mex. 2,000	....	1,000.00	1,000.00
General Mission Board of the Church of the Brethren			
Pingtingchow—X-ray equipment (C.M. 2620)	....	1,200.00	1,200.00
London Missionary Society			
Siaochang—Support of additional staff (C.M. 2167)			
Balance of previous instalments	1,800.00	....	1,046.25
Instalment for 1923	....	600.00	....
Tsangchow—Support of additional staff (C.M. 2326). Balance of previous instalments	3,000.00	....	1,918.13
Nanking Union Hospital			
Buildings and equipment—Mex. 45,000 (C.M. 2574)	27,000.00	....	....
Maintenance (C.M. 2575)			
Balance of previous instalments	9,250.00	....	9,250.00
Instalment for 1923	....	9,250.00	....

EXHIBIT J—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
HOSPITALS OF MISSIONARY SOCIETIES—*Continued*			
United Christian Missionary Society			
Luchowfu			
Support of additional staff (C.M. 2330, 2331)			
Balance of previous instalments	$7,530.00	$........	$2,870.00
Instalment for 1923—Mex. 3,000	....	2,800.00	....
Maintenance (C.M. 2329, 2637)			
Balance of previous instalments	12,300.00	....	592.76
Instalment for 1923—Mex. 17,223	....	12,100.00	....
Buildings and fixed equipment (C.M. 2327)	500.00	....	Cr. 544.89
Movable equipment—Mex. 5,250 (C.M. 2328)	4,800.00	....	2,819.09
Luchowfu, Nantungchow			
Support of additional staff (C.M. 2100). Balance of previous instalments	15,292.50	....	2,847.50
Nantungchow			
Support of additional staff (C.M. 2218)			
Balance of previous instalments	5,100.00	....	....
Instalment for 1923	....	1,650.00	....
X-ray equipment (C.M. 2621)	....	500.00	500.00
United Free Church of Scotland			
Mukden—Support of additional staff (C.M. 2232). Balance of previous instalments	1,500.00	....	750.00
Women's Foreign Missionary Society of the Methodist Episcopal Church			
Kiukiang—Support of additional staff (C.M. 2359). Instalment for 1923—Mex. 525	....	500.00	....

Loss in Exchange			
To cover loss in exchange on payments to missionary societies for their hospitals (C.M. 2503)	29,602.38	....	2,382.79
Missionary Societies—Hospitals and Premedical Education			
Yale Foreign Missionary Society			
Hunan-Yale Medical School, Changsha			
Support of additional staff of hospital, premedical school, and nurses' training school—Mex. 41,605 and $6,645 a year for five years (C.M. 2454, 2455)			
Balance of previous instalments	86,253.42	....	28,763.44
Instalment for 1923	....	56,645.00	....
Hospitals Under Chinese Management			
Central Hospital, Peking			
Support of additional staff (C.M. 2464)			
Balance of previous instalments	12,500.00	....	1,341.93
Instalment for 1923—Mex. 4,000	....	2,500.00	....
X-ray equipment (C.M. 2617)	....	1,000.00	....
Red Cross General Hospital, Shanghai			
X-ray equipment—Mex. 3,000 (C.M. 2595)	2,000.00	....	1,572.74
Premedical Education			
Canton Christian College			
Equipment (C.M. 2443)	10,000.00	....	....
Support of additional staff—Mex. 10,200 a year for five years (C.M. 2445)			
Balance of previous instalments	12,000.00	....	....
Instalment for 1923	....	12,000.00	....
Construction and equipment of science building—Hk 77,700 (C.M. 2631)	....	47,000.00	....

EXHIBIT J—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
PREMEDICAL EDUCATION—*Continued*			
Fukien Christian University			
Support of additional staff—$12,700 a year for five years (C.M. 2274, 2275) Instalment for 1923	$........	$12,700.00	$........
Maintenance of science department $10,000 a year for five years (C.M. 2276) Instalment for 1923	....	10,000.00	....
Ginling College			
Support of additional staff—Mex. 2,400 a year for five years (C.M. 2402)			
Balance of previous instalments	3,564.00	....	1,260.00
Instalment for 1923	....	2,400.00	....
Nankai College			
Science building—Mex. 100,000 (C.M. 2591)	60,000.00	....	27,609.05
Scientific equipment—Mex. 25,000 (C.M. 2592)	15,000.00	....	....
Support of additional staff—Mex. 6,750 a year for three years (C.M. 2593) Instalment for 1923	....	4,050.00	264.41
Support of visiting professor—1923 (C.M. 2632)	....	9,000.00	5,000.00
Peking (Yenching) University			
Maintenance of premedical department, $7,500 a year for two years (C.M. 2569)			
Balance of previous instalment	1,875.00	....	1,875.00
Instalment for 1923	....	7,500.00	5,625.00

Construction and equipment of science building, Mex. 150,000 (C.M. 2602)	....	90,000.00	20,000.00
St. John's University, Shanghai			
Maintenance, $18,800 extending over a period of four years (C.M. 2415) Instalment for 1923	....	4,000.00	4,000.00
Southeastern University			
Support of additional staff, Mex. 6,750 a year for three years (C.M. 2589)			
Instalment for 1922	4,050.00	....	1,366.04
Instalment for 1923	....	4,050.00	....
Science building, Mex. 100,000 (C.M. 2587)	60,000.00	....	....
Scientific equipment Mex. 25,000 (C.M. 2588)	15,000.00	....	....
Support of visiting professor (C.M. 2590)	5,263.28	....	3,663.28
Miscellaneous			
Committee of Reference and Counsel of the Foreign Missions Conference of North America—Toward expenses of survey of education under missionary auspices in China (C.M. 2533)	8,000.00	....	8,000.00
Studies of premedical education in China 1922 (C.M. 2568)	3,342.82	....	1,466.89
Salary of specialist in science teaching for work under the direction of the National Educational Reform Association of China (C.M. 2565, 2628)	4,513.90	5,000.00	5,347.14
MEDICAL EDUCATION			
Medical Schools—Affiliated			
Peking Union Medical College			
Purchase of additional property (C.M. 2381)	4,808.58	....	....
Buildings and fixed equipment (C.M. 2495, 2613, 2646)	27,266.49	83,000.00	Cr. 42,047.26
Alterations to original buildings (C.M. 2582, 2635)	54,095.14	17,400.00	68,722.29
Alterations to new buildings (C.M. 2566)	4,820.81	....	4,377.93
Alterations to Chinese houses (C.M. 2579)	3,807.99	....	2,460.79

EXHIBIT J—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
MEDICAL EDUCATION—*Continued*			
Medical Schools—Affiliated—*Continued*			
Movable equipment (C.M. 2409, 2583, 2614)	$30,822.69	$17,000.00	$23,809.80
Accessories (C.M. 2529)	18,657.78	....	Cr. 30,650.44
Heavy furniture for staff residences (C.M. 2378)	7,741.96	....	....
Library (C.M. 2440, 2624)	3,632.53	8,000.00	4,448.12
Peking stock (C.M. 2648)	....	250,000.00	....
Operation			
Budget 1921–22 (C.M. 2535)	21,039.73	....	....
Budget 1922–23 (C.M. 2567, 2600)	350,000.00	350,000.00	603,944.80
Budget 1923–24 (C.M. 2626)	....	350,000.00	162,463.36
Contingent Fund			
Year 1922–23 (C.M. 2584)	15,000.00	15,000.00	21,870.47
Year 1923–24 (C.M. 2627)	....	15,000.00	2,200.57
Retiring allowances (C.M. 2649)	....	101,000.00	92,337.11
Expenses in America			
Year 1923 (C.M. 2611)	....	44,000.00	42,217.19
Insurance on buildings			
Year 1922 (C.M. 2545)	35.36	....	....
Year 1923 (C.M. 2601)	....	8,100.00	8,007.48
Travel and expenses of trustees in attending dedication of college (C.M. 2494)	12,096.52	....	9,344.49
Visiting professors			
Year 1922 (C.M. 2549)	9,106.49	....	3,480.92
Year 1923 (C.M. 2609)	....	30,000.00	20,664.62

Training Service for Chinese doctors			
Year 1922–23 (C.M. 2581)	20,000.00	....	7,172.91
Year 1923–24 (C.M. 2630)	....	22,000.00	649.99
Diet investigation (C.M. 2539)	7,612.65	....	6,631.56
Field studies in kala-azar (C.M. 2633)	....	15,000.00	....
Shanghai Medical School			
Purchase of land (C.M. 2269, 2429)	10,160.88	....	8,642.53
Medical Schools—Unaffiliated			
National Medical College, Peking—X-ray equipment (C.M. 2618)	....	1,500.00	....
Shantung Christian University			
Maintenance, Mex. 33,000 a year for four years (C.M. 2578)			
Balance of previous instalments	6,016.24	....	4,496.25
Instalment for 1923	....	20,000.00	13,210.32
Purchase of land, construction of buildings and equipment (C.M. 2636)	....	50,000.00	....
FELLOWSHIPS AND SCHOLARSHIPS			
For study in the United States and Europe 1923 (C.M. 2605, 2606, 2607, 2645, 2669)	....	35,500.00	25,141.44
For study at the Peking Union Medical College			
Chinese students			
1922–23 (C.M. 2580)	8,890.33	....	3,172.73
1923, July 1 to Dec. 31 (C.M. 2629)	....	5,000.00	366.99
Foreign students			
1922 (C.M. 2560)	2,831.86	....	1,739.20
1923 (C.M. 2608)	....	6,000.00	1,636.76
Students from the Canton Christian College for study in the medical department of the University of Hongkong—Hk 5,600 extending over a period of five years (C.M. 2554 to 2558) Instalment for 1923	....	600.00	....

EXHIBIT J—*Continued*

	PRIOR APPROPRIATIONS	1923 APPROPRIATIONS	1923 PAYMENTS
EDUCATIONAL CAMPAIGN			
Council on Health Education. Toward general budget, Mex. 13,500 a year for two years (C.M. 2642) Instalment for 1923	$........	$7,500.00	$........
For carrying out a special campaign among the middle schools and colleges of China concerning the value and possibilities of scientific medicine, Mex. 4,500 a year for five years (C.M. 2643) Instalment for 1923	....	2,500.00	....
TRANSLATION			
China Medical Missionary Association, Publication Committee. For use in translation work (C.M.2423, 2532, 2638)			
Balance of previous instalments	10,882.18	....	4,282.35
Instalment for 1923, Mex. 8,000	....	5,000.00	4,180.00
National Medical Association of China. Toward its share of the expenses of the Terminology Committee, Mex. 500 a year for five years (C.M. 2453)			
Instalment for 1922	600.00	....	....
Instalment for 1923	....	600.00	....
MISCELLANEOUS			
China Medical Missionary Association. Expenses of Association, Mex. 15,000 a year for two years (C.M. 2585)			
Instalment for 1922	9,000.00	....	7,835.38
Instalment for 1923	....	9,000.00	....
Committee of Three Chinese Scientists—Expenses of visit to America (C.M. 2562)	8,500.00	....	....

North China American School, Tungchow—Maintenance, Mex. 5,000 (C.M. 2598)	3,000.00	....	2,687.13
North China Union Language School—Toward cost of recitation building and library, Mex. 40,000 (C.M. 2502)	45,000.00	....	2,540.90
Emergency Fund—For aid of medical work in China, at the discretion of the resident director (C.M. 2559, 2647)	811.13	1,500.00	748.09
ADMINISTRATION			
Home Office (C.M. 2610, 2641)	....	29,752.60	27,809.31
Peking Office (C.M. 2563, 2612, 2625)	5,684.88	42,400.00	23,310.17
Architectural Bureau in Peking Office (C.M. 2616)	....	8,000.00	1,623.23
Retiring Allowances (C.M. 2667)	....	20,750.00	16,652.26
TOTALS	$1,370,725.94	$1,937,255.10	$1,354,942.55
Unexpended balances of appropriations allowed to lapse	245,375.53	132,533.76	....
NET TOTALS *	$1,125,350.41	$1,804,721.34	$1,354,942.55

Refunds of amounts disbursed in prior years—	
Shanghai Medical School Buildings and fixed equipment (C.M. 2413)	$9,010.56
Peking Union Medical College Street Improvements (C.M. 2401)	100.28
	$9,110.84

* The Foundation appropriated to the China Medical Board for its work during the year 1923 the sum of $1,971,750.

EXHIBIT K

SUMMARY OF APPROPRIATIONS AND PAYMENTS

	Prior Appropriations	1923 Appropriations	1923 Payments
International Health Board	$1,313,185.73	$2,891,177.04	$2,332,511.00
China Medical Board	1,125,350.41	1,804,721.34	1,354,942.55
Medical Education	661,712.77	4,783,038.17	3,556,025.02
Schools of Hygiene and Public Health	500,000.00	125,000.00	618,750.00
Biology, Physics, and Chemistry	7,074.07	165,000.00	117,427.47
Hospital, Dispensary, and Nursing Studies and Demonstrations	25,233.97	244,000.00	161,504.60
Mental Hygiene	7,299.45	53,000.00	52,152.70
Miscellaneous	10,644.75	99,182.26	50,825.40
Administration	3,153.20	214,485.05	186,936.46
Totals	$3,653,654.35	$10,379,603.86	$8,431,075.20
Prior Appropriations	$3,653,654.35		
1923 Appropriations	10,379,603.86		
Total Appropriations		$14,033,258.21	
1923 Payments		8,431,075.20	
Balance Payable on Appropriations			$5,602,183.01

In addition to the foregoing, the Foundation has made pledges and appropriations which become effective in future years, and will require for payment the following amounts:

YEAR 1924		
International Health Board	$3,060,000.00	
China Medical Board	1,459,100.00	
Medical Education	2,719,591.27	
Schools of Hygiene and Public Health	1,515,000.00	
Miscellaneous	581,128.44	
		$9,334,819.71
YEAR 1925		2,670,126.50
YEAR 1926		1,830,655.50
YEAR 1927		627,495.00
YEAR 1928		447,295.00
YEAR 1929		126,500.00
YEAR 1930		79,709.00
TOTAL		$15,116,600.71

EXHIBIT L

STATEMENT OF APPROPRIATIONS AND PAYMENTS ON ACCOUNT OF SPECIAL FUNDS DURING THE YEAR 1923

	APPROPRIATIONS	PAYMENTS
LAURA S. ROCKEFELLER FUNDS		
Baptist Home for the Aged in New York City (R. F. 2697)	$500.00	$500.00
Baptist Home of Northern Ohio (R. F. 2695)	500.00	500.00
Euclid Avenue Baptist Church of Cleveland, Ohio (R. F. 2696)	1,500.00	1,500.00
Ministers and Missionaries Benefit Board of the Northern Baptist Convention (R. F. 2694)	500.00	500.00
	$3,000.00	$3,000.00
JOHN D. ROCKEFELLER FUND		
Baptist Home for the Aged in New York City (R. F. 2698, 2699)	$1,850.00	$1,850.00

EXHIBIT M

STATEMENTS OF PRINCIPAL FUNDS

General Fund

Balance of Mr. Rockefeller's gifts December 31, 1922	$165,204,624.50

This fund is accounted for in securities and secured demand loans.

Laura S. Rockefeller Funds

Gifts comprising four separate funds	$49,300.00
Excess of proceeds of bonds redeemed over ledger valuation, added to principal	700.00
	$50,000.00

These funds are invested in securities and cash on deposit.

John D. Rockefeller Fund

Gifts	$37,000.00

This fund is invested in securities.

Henry Sturgis Grew Memorial Fund

Gift to Harvard Medical School of China transferred to the Foundation in trust	$25,000.00
The securities in which this fund was invested have been delivered to the Harvard Medical School of China, in accordance with a resolution of the Board adopted at its meeting of December 6, 1922	25,000.00
	$00,000.00

Arthur Theodore Lyman Endowment

Amount received from Harvard Medical School of China and held as a principal fund for Shanghai Medical School	$5,500.00
The securities in which this fund was invested have been delivered to the Harvard Medical School of China in accordance with a resolution of the Board adopted at its meeting of December 6, 1922	5,500.00
	$0,000.00

EXHIBIT N

LAND, BUILDINGS, AND EQUIPMENT FUNDS

		December 31, 1922	Expenditures 1923	December 31, 1923
The Rockefeller Foundation:				
Library		$3,897.04	$554.44	$4,451.48
Equipment	$35,429.22			
Less depreciation	7,099.37			
		28,329.85	2,377.82	30,707.67
Net Totals, The Rockefeller Foundation		$32,226.89	$2,932.26	$35,159.15
China Medical Board:				
Peking Union Medical College:				
Original purchase		$171,013.29	$........	$171,013.29
Additional land		202,145.46	....	202,145.46
New buildings		6,956,968.47	Cr. 42,047.26	6,914,921.21
Alterations—original buildings		221,904.86	68,722.29	290,627.15
Alterations—Chinese houses		2,192.01	2,460.79	4,652.80
Movable equipment		423,777.31	23,809.80	447,587.11
Accessories		412,342.22	Cr. 30,650.44	381,691.78
Supplies		20,200.09	....	20,200.09
Heavy furniture for staff residences		7,258.04	....	7,258.04
Library		76,367.47	4,448.12	80,815.59
Street improvements		9,000.00	Cr. 100.28	8,899.72
Shanghai Medical School:				
Land		290,202.72	8,642.53	298,845.25
New buildings	$56,654.54			
Amount written off, as project has been abandoned	47,643.98			
		9,010.56	Cr. 9,010.56	....

Movable equipment	$39.76			
Amount written off, as project has been abandoned	39.76	....	....	....
Accessories	$39.76			
Amount written off, as project has been abandoned	39.76	....	....	....
Net Totals, China Medical Board		$8,802,382.50	$26,274.99	$8,828,657.49
Net Grand Totals		$8,834,609.39	$29,207.25	$8,863,816.64

Summary

Expenditures to December 31, 1922	
The Rockefeller Foundation	$39,326.26
China Medical Board	8,850,106.00
	$8,889,432.26
Less depreciation as shown above	54,822.87
Balance 1922 and prior years	$8,834,609.39
Net expenditures during 1923	29,207.25
Total, December 31, 1923	$8,863,816.64

EXHIBIT O

SCHEDULE OF SECURITIES IN GENERAL FUND ON DECEMBER 31, 1923

BONDS

Name	Rate Per Cent	Date of Maturity	Amount	Price Per Cent	Foundation's Ledger Value
American Agricultural Chemical Co. First Mortgage Convertible	5	Oct. 1928	$310,000	101.	$313,100.00
American Telephone & Telegraph Co. Thirty-year Collateral Trust	5	Dec. 1946	100,000	97.75	97,750.00
Armour & Co. Real Estate First Mortgage	4½	June 1939	1,000,000	93.25	932,500.00
Atlantic & Birmingham Ry. First Mortgage	5	Jan. 1934	677,000	90.	609,300.00
Baltimore & Ohio R. R. Refunding and General Mortgage	5	Dec. 1995	650,000	99.75	648,375.00
Belgian Government Securities			Fcs 35,600,000		2,556,722.23
Chicago & Alton R. R. Refunding Mortgage	3	Oct. 1949	$551,000	65.	358,150.00
Chicago & Alton Ry. First Lien	3½	July 1950	854,000	53.	452,620.00
Chicago City & Connecting Railways Collateral Trust	5	Jan. 1927	1,305,000	85.	1,109,250.00
Chicago, Milwaukee & St. Paul Ry. General Mortgage Series "A"	4	May 1989	30,000	97.	29,100.00
Chicago, Milwaukee & St. Paul Ry. General Mortgage Series "C"	4½	May 1989	500,000	103.	515,000.00
Chicago, Milwaukee & St. Paul Ry. Debenture	4	July 1934	450,000	88.2838	397,277.50
Chicago, Milwaukee & St. Paul Ry. General and Refunding Mortgage Series "A"	4½	Jan. 2014	500,000	91.0625	455,312.50

Chicago & North Western Ry. Extension	4	Aug. 15 '26	$50,000	95.	$47,500.00
Chicago & North Western Ry. Sinking Fund Debenture	5	May 1933	80,000	102.	81,600.00
Chicago Railways Co. First Mortgage	5	Feb. 1927	500,000	97.	485,000.00
Cleveland, Cincinnati, Chicago & St. Louis Ry., St. Louis Division Collateral Trust	4	Nov. 1990	73,000	90.	65,700.00
Cleveland, Cincinnati, Chicago & St. Louis Ry. General	4	June 1993	700,000	83.893	587,250.00
Cleveland Short Line First Mortgage	4½	Apr. 1961	500,000	95.	475,000.00
Colorado Industrial Co. First Mortgage	5	Aug. 1934	2,000,000	80.	1,600,000.00
Dominion of Canada, Government of, Fifteen-year	5	Apr. 1931	500,000	94.565	472,825.00
Erie R. R. General Mortgage Convertible Fifty-year Series "B"	4	Apr. 1953	1,065,000	74.7175	795,742.30
Illinois Central R. R. Refunding Mortgage	4	Nov. 1955	300,000	87.	261,000.00
Interborough Rapid Transit Co. First Mortgage (Stamped)	5	Jan. 1966	1,750,000	96.8571	1,695,000.00
International Mercantile Marine Co. First and Collateral Trust Sinking Fund	6	Oct. 1941	2,848,000	97.5	2,776,800.00
Lake Erie & Western R. R. Second Mortgage	5	July 1941	100,000	100.	100,000.00
Lake Shore & Michigan Southern Ry. First Mortgage	3½	June 1997	926,000	87.	805,620.00
Lake Shore & Michigan Southern Ry. Debenture	4	May 1931	1,673,000	92.	1,539,160.00
Magnolia Petroleum Co. First Mortgage	6	Jan. 1937	1,786,000	100.	1,786,000.00
Missouri, Kansas & Texas R. R. Prior Lien Series "A"	5	Jan. 1962	331,250	78.5	260,031.25
Missouri, Kansas & Texas R. R. Prior Lien Series "B"	4	Jan. 1962	331,250	64.5	213,656.25
Missouri, Kansas & Texas R. R. Adjustment Series "A"	5	Jan. 1967	96,800	61.5	59,532.00

EXHIBIT O—*Continued*

Name	Rate Per Cent	Date of Maturity	Amount	Price Per Cent	Foundation's Ledger Value
Morris & Essex R. R. First and Refunding Mortgage	3½	Dec. 2000	$175,000	82.75	$144,812.50
Mutual Fuel Gas Co. First Mortgage	5	Nov. 1947	250,000	100.	250,000.00
National Railways of Mexico, Prior Lien Fifty-year Sinking Fund, with January 1915 and subsequent coupons attached	4½	July 1957	50,000	59.	29,500.00
Secured 6% Notes for coupon due January 1, 1914		Jan. 1917	1,125	59.	663.75
Guaranty Trust Co. Receipt for July 1, 1914 coupon			1,125	59.	663.75
New York Central Lines Equipment Trust of 1913	4½	Jan. '24–'28	180,000	99.0393	178,270.76
New York Central & Hudson River R. R. Thirty-year Debenture	4	May 1934	330,000	88.45	291,885.00
New York, Chicago & St. Louis R. R. First Mortgage	4	Oct. 1937	35,000	95.	33,250.00
New York, Chicago & St. Louis R. R. Debenture	4	May 1931	1,303,000	87.	1,133,610.00
New York Connecting R. R. First Mortgage	4½	Aug. 1953	500,000	95.69073	478,453.65
Northern Pacific Ry. Refunding and Improvement Mortgage	4½	July 2047	390,000	91.577	357,150.00
Pennsylvania R. R. Consolidated Mortgage Sterling	4	May 1948	£2,400	99.	11,880.00
Pennsylvania R. R. General Mortgage	4½	June 1965	$1,500,000	98.25	1,473,750.00
Pittsburg, Cincinnati, Chicago & St. Louis Ry. Consolidated Mortgage Series "I"	4½	Aug. 1963	500,000	103.	515,000.00
Reading Co.—Philadelphia & Reading Coal & Iron Co. General Mortgage	4	Jan. 1997	500,000	94.25	471,250.00

Rutland R. R. First Consolidated Mortgage	4½	July 1941	$25,000	90.	$22,500.00
St. Louis—San Francisco Ry. Prior Lien Series "A"	4	July 1950	1,500,000	72.75	1,091,250.00
Seaboard Air Line Ry. Adjustment Mortgage	5	Oct. 1949	455,000	77.	350,350.00
Southern Pacific R. R. First and Refunding Mortgage	4	Jan. 1955	100,000	86.	86,000.00
United States Fourth Liberty	4¼	Oct. 15 '38	1,075,000	93.21347	1,002,044.80
United States Second Liberty Converted	4¼	Nov. 15 '42	2,100,000	93.00921	1,953,193.40
United States Government Treasury Notes Series "B"	4¾	Mar. 15 '27	3,000,000	100.	3,000,000.00
United States Government Treasury Notes Series "C"	4½	June 15 '25	3,000,000	100.	3,000,000.00
United States Government Treasury Notes	4¼	Sept. 15 '26	1,000,000	100.	1,000,000.00
United States Government Treasury Notes Series "A"	4½	Dec. 15 '27	4,000,000	100.	4,000,000.00
United States Government Treasury Certificates of Indebtedness	4½	Mar. 15 '24	3,000,000	100.	3,000,000.00
Wabash R. R. Second Mortgage	5	Feb. 1939	120,000	97.8	117,360.00
Washington Ry. & Electric Co. Consolidated Mortgage	4	Dec. 1951	450,000	83.5	375,750.00
Western Maryland R. R. First Mortgage	4	Oct. 1952	1,032,000	78.8913	814,158.76
Wheeling & Lake Erie R. R. Lake Erie Division First Mortgage	5	Oct. 1926	140,000	100.	140,000.00
Wheeling & Lake Erie R. R. Equipment Trust Series "B"	5	Apr. '24–'27	200,000	99.75	199,500.00
Wilson Realty Co. First Mortgage	6	July 1929	7,500	95.	7,125.00
TOTAL BONDS					$48,111,245.40

EXHIBIT O—*Continued*

STOCKS

Name	Number of Shares	Price per Share	Foundation's Ledger Value
American Ship Building Co. Common	24,260	$54.173537	$1,314,250.00
Anglo-American Oil Co. Ltd. (Par £1)	366,517	25.166404	9,223,915.10
Atchison, Topeka & Santa Fe Ry. Preferred	5,000	98.25	491,250.00
Atchison, Topeka & Santa Fe Ry. Common	21,100	95.2563	2,009,908.33
The Buckeye Pipe Line Co. (Par $50)	49,693	100.	4,969,300.00
Central National Bank, Savings & Trust Co. Capital	950	177.8538	168,961.10
Chehalis & Pacific Land Co. Capital	220	29.4272	6,473.95
Chesebrough Manufacturing Co. Consolidated	2,070	220.4522	456,336.14
Chicago City & Connecting Rys. Participation Certificates Preferred	17,530	15.	262,950.00
Chicago City & Connecting Rys. Participation Certificates Common	10,518	2.	21,036.00
Chicago & Eastern Illinois Ry. Preferred	3,000	34.	102,000.00
Cleveland Arcade Co. Capital	2,500	98.6222	246,555.56
Cleveland Trust Co. Capital	457	195.7541	89,459.62
Colorado & Southern Ry. First Preferred	4,800	54.	259,200.00
Consolidated Gas Co. of N. Y. Capital (No par value)	40,000	60.5889375	2,423,557.50
The Continental Oil Co. (Par $25)	82,200	15.561832	1,279,182.61
The Crescent Pipe Line Co. (Par. $25)	14,120	35.	494,200.00
Cumberland Pipe Line Co	6,000	40.6666	244,000.00
Erie R. R. First Preferred	21,400	45.8306	980,773.76
Eureka Pipe Line Co.	12,357	175.	2,162,475.00
Galena Signal Oil Co. Preferred	4,193	139.70	585,779.50

Galena Signal Oil Co. Common	20,000	$170.94	$3,418,790.04
Great Lakes Towing Co. Preferred	1,527	88.7361	135,500.05
Great Lakes Towing Co. Common	1,200	12.	14,400.00
Indiana Pipe Line Co. (Par. $50)	24,845	105.1111	2,611,485.28
Kanawha & Hocking Coal & Coke Co. Preferred	202	100.	20,200.00
Kanawha & Hocking Coal & Coke Co. Common	668	90.953	60,756.40
Manhattan Ry. Capital (Modified Guarantee)	10,000	100.	1,000,000.00
Missouri, Kansas & Texas R. R. Co. 7% Preferred	9,531	40.	381,240.00
Missouri Pacific R. R. Convertible Preferred	17,880	55.50	992,340.00
National Transit Co. (Par. $12.50)	126,481	28.50	3,604,708.50
New York Transit Co.	12,392	150.	1,858,800.00
Northern Pacific Ry. Common	700	91.7625	64,233.75
Northern Pipe Line Co.	9,000	95.	855,000.00
Pere Marquette Ry. Preferred	5,740	54.56502	313,204.35
Provident Loan Certificates (Par. $5,000)	40	100.	200,000.00
Seaboard Air Line Ry. Preferred	4,300	10.	43,000.00
Seaboard Air Line Ry. Common	3,400	5.	17,000.00
The Solar Refining Co.	9,076	92.5035	839,561.76
Southern Pipe Line Co.	24,845	125.	3,105,625.00
South West Pennsylvania Pipe Lines	8,000	125.	1,000,000.00
Standard Oil Co. (Indiana) (Par $25)	460,760	43.35	19,973,946.00
Standard Oil Co. (Nebraska)	7,366	90.	662,940.00
Standard Oil Co. (New Jersey) Non-voting Cumulative Preferred	55,000	102.8729	5,658,008.48
Standard Oil Co. (New Jersey) Common (Par $25)	919,500	36.475	33,538,762.50
The Standard Oil Co. (Ohio) Common	33,912	102.	3,459,024.00
The Standard Oil Co. (Ohio) Non-voting Cumulative Preferred	17,088	106.	1,811,328.00
Tilden Iron Mining Co. Capital	1,780	27.35	48,683.46
Union Tank Car Co. Common	36,000	44.6135	1,606,087.97

EXHIBIT O—*Continued*

Name	Number of Shares	Price per Share	Foundation's Ledger Value
Virginia-Carolina Chemical Co., Non-voting, no par, Class "B" Common	8,750	$18.	$157,500.00
Washington Oil Co. (Par $10)	1,774	30.	53,220.00
Western Pacific R. R. Corporation Preferred	20,195	43.50	878,482.50
Western Pacific R. R. Corporation Common	30,292½	15.25	461,960.62
Wilson Realty Co. Capital	591	100.	59,100.00
Woman's Hotel Co. (In liquidation) Capital	300	15.	4,500.00
Total Stocks	....	....	$116,700,952.83

SUMMARY

Bonds	$48,111,245.40
Stocks	116,700,952.83
Total ledger value of investments belonging to General Fund	$164,812,198.23

EXHIBIT P

SCHEDULE OF SECURITIES IN SPECIAL FUNDS ON DECEMBER 31, 1923

JOHN D. ROCKEFELLER FUND

BONDS

Name	Rate Per Cent	Date of Maturity	Amount	Price Per Cent	Foundation's Ledger Value
Canada Southern Ry. Consolidated Mortgage Series "A"	5	Oct. 1962	$37,000	100.	$37,000.00
Total Bonds					$37,000.00

LAURA S. ROCKEFELLER FUND

BONDS

Name	Rate Per Cent	Date of Maturity	Amount	Price Per Cent	Foundation's Ledger Value
Colorado Industrial Co. First Mortgage	5	Aug. 1934	$50,000	80.	$40,000.00
Total Bonds					$40,000.00

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